

Sheridan College

SOURCE: Sheridan Scholarly Output Undergraduate Research Creative Excellence

Faculty Publications and Scholarship

School of Architectural Technology

2014

Towards a New Paradigm in Architectural Education

Ken Snell

Sheridan College, ken.snell@sheridancollege.ca

Follow this and additional works at: http://source.sheridancollege.ca/fast_arch_publ

 Part of the [Architecture Commons](#), and the [Education Commons](#)

SOURCE Citation

Snell, Ken, "Towards a New Paradigm in Architectural Education" (2014). *Faculty Publications and Scholarship*. Paper 2.
http://source.sheridancollege.ca/fast_arch_publ/2



This work is licensed under a [Creative Commons Attribution-Noncommercial-No Derivative Works 4.0 License](#).

This Article is brought to you for free and open access by the School of Architectural Technology at SOURCE: Sheridan Scholarly Output Undergraduate Research Creative Excellence. It has been accepted for inclusion in Faculty Publications and Scholarship by an authorized administrator of SOURCE: Sheridan Scholarly Output Undergraduate Research Creative Excellence. For more information, please contact source@sheridancollege.ca.



TOWARDS A NEW
PARADIGM
IN ARCHITECTURAL EDUCATION

TOWARDS A NEW
PARADIGM
IN ARCHITECTURAL EDUCATION

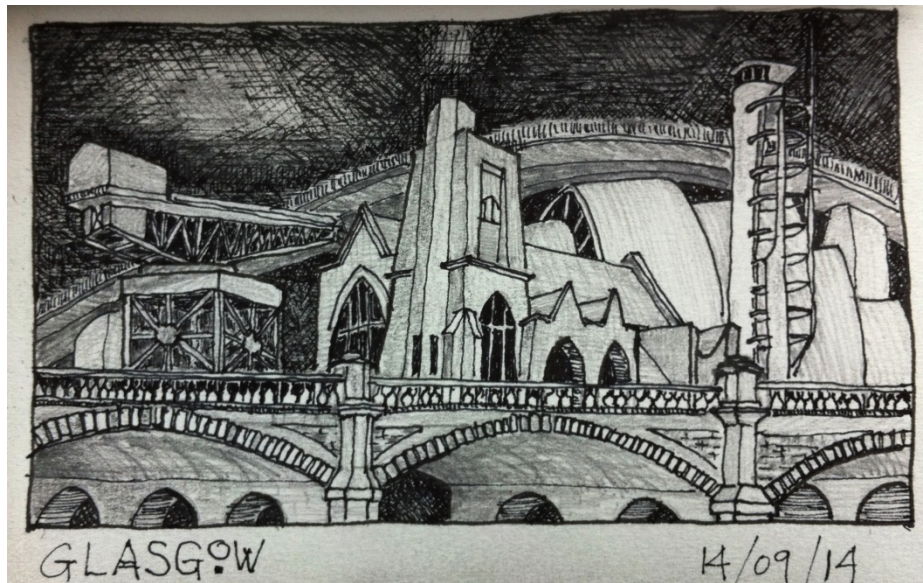
Images on the cover:

Left: Lochranza Castle, Arran Island, Scotland 15th century

Right: The Drilled Void, Glasgow School of Art, Glasgow by Steven Holl, 2014.

To
Heather and
the Sheridan community,
whom have taught me that
all of us in the practice of architecture
are perennial students

...



ACKNOWLEDGEMENTS

It is indeed a privilege and a pleasure to have been awarded time to travel, to experience other schools, to read extensively, to sift through the accumulated ideas of twenty-five years of personal teaching practice and organize them into a higher order of understanding. It is also wonderful to find (both online and in person) a network of individuals dedicated to the practice of architectural education and to use their writing and experience to better focus my own practice. I do hope that this paper will be a meaningful contribution into the ongoing discussion and clarification of creative learning and instructional practice at Sheridan College, Faculty of Architectural Technology.

As you read this, I do hope that you will be inspired to look reflectively at your own practice of teaching and learning.

Maybe we could meet for coffee sometime and talk about this...

Thanks.

ABOUT THE BOOK

(What this is and what this is not...)

The creative design process is spontaneous, non-linear, often unexpected and unpredictable. Sometimes ideas seem to “rise” to consciousness as if by magic. It is the foundational notion of this work that this “magical” creative process can be influenced, guided, streamlined, taught and learned. This document is *a discipline specific theoretical paradigm for creativity in the practice and assessment of architectural learning*. The generating question that drives this study forward is contained within the process of designing architectural curriculum. That question is “How will you know whether or not you have accomplished what you set out to accomplish”? This is more difficult than it seems at first because *evaluation* is based upon a set of *values* that are explicitly, or implicitly, embedded within a cultural context. The essay “*The Role of Culture*” establishes as fact that our definitions of creative endeavour are culturally based. Educators cannot design assessment tools until they achieve agreement upon what it is that they are attempting to evaluate, especially if what they are attempting to evaluate has been embedded within an implicit or previously invisible set of values. It is commonly accepted that architects share certain professional characteristics but it is less generally known that there is no agreement within the profession as to the desired role of an architectural education. The essay “*Academic Cultures in Architecture*” reveals different cultural ideologies within the profession itself that influence the very definition of creativity while determining what should be taught and how creativity should be evaluated. These different ideologies create different educational experiences. The essay “*Defining Creativity within Architectural Technology*” proposes a definition of creativity situated within the specific context of a technically based architectural education.

This is not an academic research paper conducted within a classroom setting, nor is it an exhaustive literature review. I have read extensively in order to expand my language and understanding of current conceptualizations of creative thinking and to provide a theoretical context for my own 25 years of teaching practice.

The discussion you are about to enter wrestles with the definition of creativity within the context of a technical architectural education. It will not be about defining “art” (architecture) versus “craft” (construction) or whether one of these is more creative than the other. It is hoped that after reading the included essay “*BIG “C” Creative and little “c” creative*”, you will agree that creativity is not so hierarchical. This paper will explore how a new discipline specific definition of creativity will recommend change to studio practice at Sheridan and make specific recommendations for changes to Architectural studio 2 (ARCH 28544) practices and evaluation methods. This document takes the position that an architect can be agent of change in the collective process of building cities (social, cultural and urban infrastructure) by impacting a city one building at a time. It situates the educator within this process as a catalyst in the exploration of shared values and group action...one student at a time.

Most educators today know that there are different types of intelligence and different ways of knowing.

Elbert Hubbard famously said that “*Art is not a thing; it is a way*”. Art making, and by extension architecture, is a way of conceptualizing, of knowing, of being in the world.

ABOUT THE PROCESS

(Why are there so many drawings?)



A pen or pencil is an instrument of connection between the hand and the mind, between the thoughts that find their conceptualization in a designer's mind but their birth as marks on a page. These marks give abstract thoughts a concrete existence. According to Paolo Belardi, *"the thread that links the hand to the brain admirably integrate(s) conscience and corporality"* (Belardi, 2014).

Sketching is a way of conceptualizing knowledge and assimilating it within existing paradigms and practices. Curiously, it simultaneously compresses complex ideas by forming a dense shorthand notational system while expanding incomplete ideas showing the spaces that need consideration and completion.



Such

simultaneity transforms a simple drawing into a two way accessible highway between knowledge (things that already exist) and concepts waiting to be brought into existence. Drawing translates verbal linear information (left – brained) into visual images (right brained). This movement of information across the corpus callosum allows it to be processed visually, spatially and relationally. This imaginative intuitive processing allows new knowledge to emerge as a result of a changed perspective. Intuitive or visual knowing is based upon different types of evidence than language based processes of knowing.

Once ideas are documented in a drawing, there is freedom to organize and re-organize the pieces into patterns, geometries and symmetries of larger more encompassing thoughts. Through the application of reason and my own extensive classroom experience, this pattern finding process allows me to recognize possible gaps where more information would be helpful to move an argument forward.

Just as there are different types of intelligence and different ways of "knowing" I propose that not all valuable academic research is conducted within a classroom setting or through extensive literature reviews. I propose that drawing (in combination with these other two methods) is a legitimate method of knowledge production. Drawing is therefore an essential source of creativity which just happens to be central to studio based educational praxis.

For me, drawing is a non-verbal or intuitive way of knowing. If I can draw it, I can understand it. By drawing the ideas of others I must slow down, look more closely, measure relationships and complete the hermeneutic circle. By that I mean understand the relationship of the component parts to the whole and the whole to the individual parts. I am able to grasp information holistically and build new knowledge structures and absorb them into my personal thinking. For me this process is a way to embody new ideas. But what does it offer you, the reader? Images allow the viewer a novel perspective and an opportunity to penetrate the ideas of others by processing information with both hemispheres in new and unique ways...

...is that not what creativity is about?

TABLE OF CONTENTS

Preface: The Phenomenal and Noumenal in Art and Architecture

Introduction

Creativity in Architectural Education

PART ONE Architectural Creativity in Context

The creative Stereotypes in the Arts and Architecture

BIG “C” Creative little ‘c’ creative

The Role of Culture

Academic Cultures in Architecture

The Role of the Task

The 4 P’s

Transformation- Metaphor-Meaning

Thought-Action-Object: A creative model

Defining creativity within Architectural Technology

PART TWO Creative Process

Educator – Student Relationship Dance

The Design Process

Revised Roles of the Educator and Student

The Design Studio

PART THREE Creativity, Context and a New Assessment Paradigm

Assessment of Creative Learning

Relationship between Activity and Assessment

Factors for consideration when quantifying performance

Studio Thinking Framework

Evaluator Responsibilities

Assessment and the Art of Observation

PART FOUR Summation

Concluding Remarks

Appendix 1: Educational Reports calling for Educational Reform

Appendix 2: Ideologies for Architects

Appendix 3: The Big Debate

Appendix 4: Application to the Re-thinking of Studio 2

Bibliography / References / Resources / Future reading

PREFACE

The Phenomenal and Noumenal in Art and Architecture...

...“The aspiration to fuse the cosmic and the human, the divine and mortal, spiritual and material combined with the use of systems, proportion and measure deriving simultaneously from the cosmic order and human figure give architectural geometries their meaning and deep sense of spiritual life”... Juhani Pallasmaa 2011



Phenomenal	Noumenal
material	immaterial
physical	metaphysical
concrete	abstract
knowable	unknowable
corporeal	divine
sensorial	faith
earth	heaven
body	mind
*(Matsunobu, K. 2011)	
*tai	*yu
flower	scent of the flower
form	expression
moon	moonlight

Artists, through their creative action upon the materials of their craft, give their ideas physical form, making invisible concepts, visible. They embed these immaterial concepts from their imagination into their work...fusing the cosmic with the human experience. Philosophers reconcile these disparate planes of existence by grounding the divine into everyday life. Artistic and religious practices attempt to embody conceptual ideas into physical presences.

Some examples of these efforts are: Jesus Christ is the son of GOD materialized on earth; the word of GOD is a written book (Quran, Bible, Torah); the Christian 10 commandments are cast in stone; Prometheus steals the fire of the Gods and brings it to earth; the Raven steals the moon and brings it to the aboriginal North American natives.

As human beings we cannot create stone or trees but with masonry, glass and lumber we can participate in *creation* by building heaven on earth. Human beings are continually grafting emotions, memories and personal meaning to physical objects and they are at the same time doing the reverse - extracting intention or meaning from objects that they encounter in their daily lives. This passage back and forth between idea and form is an act of metaphor making, an act of attempted understanding. It is a way of knowing, an act of creation. It is the creation of meaning, the creation of place.

In as much as this work is about creative learning, it is also about creative teaching. *“Creative teaching brings ideas to the ground at the place where we stand”* (Ken Snell, 2014).

INTRODUCTION

In anticipation of the arrival of a new creative economy current academic institutions around the world are changing. (see appendix 1 OECD) At the moment there is much interest, debate and research in the study of creativity, creative learning and teaching, the nature of creative genius, creative play, imagination and invention, and in educational policy making. If David Boud is correct in his opinion that *“assessment methods and requirements probably have a greater influence on how and what students learn than any other single factor. This influence may well be of greater importance than the impact of teachers or teaching materials”* (Boud 1988) then the development of the techniques, tools and methods for the assessment of creativity must be developed and tailored to suit the many disciplines of study that arise from a multiplicity of academic cultures.

Here at Sheridan College this anticipation of the coming creative economy has resulted in an opportunity to re-invent curriculum in conjunction with a new institution-wide “Be Creative” pedagogical initiative. Educators at Sheridan tasked with implementation of this mandate need to be cognizant of the fact that a learning concept must be *evaluated* in order to be included in the respective course outline as a learning outcome. This means that we cannot simply add the learning outcome “Foster personal creative development through enhancements in a student’s personal creative process” to our course outlines without changing our evaluation strategies as well. However, the assessment / evaluation component of education reform seems to lag behind all the other scholarly research activity regarding creativity. Many educators believe that the development of clear evaluation criteria will influence the design process negatively by predisposing students towards certain inferred design approaches. Other educators believe that open-ended design questions require flexible, open-ended evaluation schemes that would stifle creative assessment if restrictive criteria were put in place. New evaluation methods must share objectives with all those interested in creative teaching, learning, standardized examinations and testing, certification, promotions, and professional qualifications or these methods will be unable to achieve authority and legitimacy within the educational community.

This is a particularly large challenge when the definition of creativity is value and belief based. Creativity cannot be assessed if you cannot agree upon what it is that you are assessing. Different disciplines have different values and beliefs. Once you have achieved consensus for defining creative learning, the curriculum and the respective activities can be determined. After all these changes are completed, how will you know that you have accomplished what it is that you originally set out to do? It is not just the student work but also the implementation process itself that needs to be assessed. These discussions about institutional change should give the study of assessment practice a logical priority. This paper attempts to begin this much needed discussion.

As we move into the new millennium and anticipate *the “creative economy or knowledge society which will underpin the 21st century”* (Sefton-Green, 2011) schools of Architecture seek to change their organizational structures and their curricular content and delivery with the intended objective of making *“schooling more exciting, relevant, challenging and dynamic and personally rewarding learning experiences and opportunities”* (Sefton-Green, 2011) that will give their successful students a competitive advantage in the marketplace and allow them to contribute meaningfully in the design process and the re-construction and renewal of our cities. Redefining creativity along the lines of the development of a student’s “flexible novelty” or “enhanced creative adaptation” will grant some of the desired competitive advantage and deliver deeper personal meaning but it will change the way knowledge is consumed and produced. It will shift the student-professor power balance in the classroom as it changes the way cultural capital is developed.

CREATIVITY IN ARCHITECTURAL EDUCATION



Find the opportunity...



Respond imaginatively...



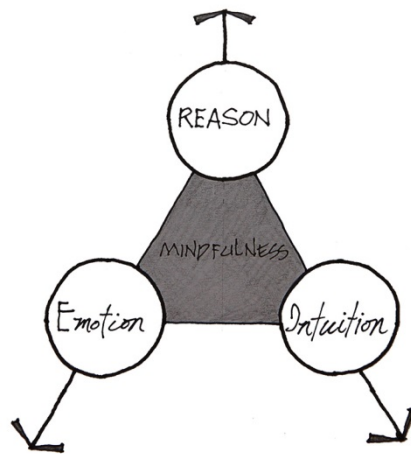
Then build it outside of your mind...

It is easy to accept the above process as normative “creative” behaviour for the architectural profession and look no further into the intricacies of architectural practice. However, I feel that I must address this generally accepted common sense and somewhat conventional view of the architectural design process in order to open it up and expose the interior dilemma facing design educators today.

In a global economy, values of practicality, speed and scale are venerated and competitive industrialized production requires predictability, repetition and standardization. All of these are anathema to the usual to a creative person. C. R. Hausman in his essay “*Criteria of Creativity*” defines novelty as *an identity without precedent*...which is an identity not foreseeable in terms of repeatable data (or precedent). Many clients today simply want what everyone else already has, or just want their new house to simply “fit in” to their chosen neighbourhood. The house on Park Terrace Lane (shown above which by the way I quite adore) with a circular blue window is certainly unusual. It is not derivative of anything else in the West End of Glasgow where it is situated. Its novelty is assured. However, novelty, just for the sake of being different, will eventually lead to absurdity. A constant striving for novel houses, forces each subsequent solution to “outdo” all the ones that precede them creating a city full of completely novel houses all clamouring for attention. The cacophony generated often leads to a dis-harmonious whole where the unpredictable environment with surprises around every corner eventually ceases to be surprising.

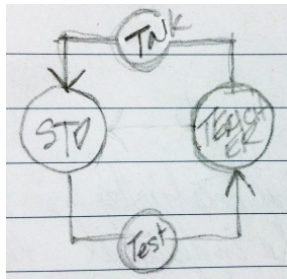
The creation of novel design solutions is not enough to sustain a professional career when approximately 90-95% of buildings built today are designed by non-architects. Why is creativity, as classically defined by novelty, desired in our schools if it means marginalization within society and disharmony in our urban environment? Should architectural educators be teaching architectural strategies suitable for the 95% of building activity rather than for the sliver of the client base that want something stunningly novel? Perhaps educators do their students a dis-service when they use this narrow definition of creativity because it is not a guarantor for a successful career nor is it generally considered to be a valued contribution to city building. A new approach might stem the progressing marginalization that architects experience within collaborative design teams today. Student work responds to the processes and precedents represented by faculty as being exemplary. If this work is inaccessible to the general public it will not be desired by the broadest client base. Classroom experiences set student expectations of what they will experience in their professional careers when they graduate. As a result, our definition and evaluation of creativity must be aware of its professional context.

This is where our discussion continues, establishing the architectural context in which creative design occurs.



C R E A T I V E P R O C E S S

THE EDUCATOR STUDENT RELATIONSHIP DANCE

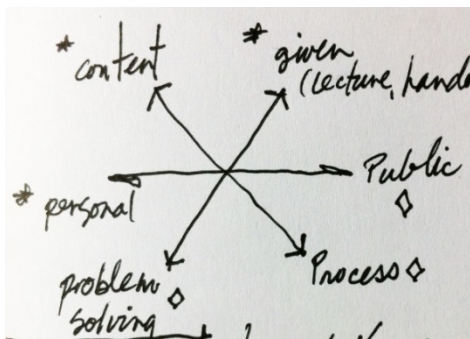


Though creative education today is slowly changing classroom practices, many people still accept the old mechanistic model (shown schematically on the left) wherein teachers talk and test while students listen and write tests. According to Andy Hargreaves, the audit culture is responsible for producing standardized curriculum focused on the delivery of “facts” to receptive students rather than on a more explorative discovery “process”. This mechanistic educational model is heavily invested in testing and measurement of factual retention.

Many educators now believe that this approach “is producing the wrong kind of worker” for the 21st century because “standardization is anathema to creativity” (Hargreaves, 2011). According to Grant Wiggins the “commission to memory in preparation for a test is not the point”. He believes that students need “challenge, feedback and choice” (Wiggins, 2011). Is the pursuit of accountability and measured outcomes leading us in the wrong direction?

“Creativity resides not only in individuals, but in social groups and their shared domains of experience”. (Csikszentmihaly, Csikszentmihaly, 1988)

It is the contention of this writer that for creative teaching and learning to occur, a more responsive student-teacher relationship is required.

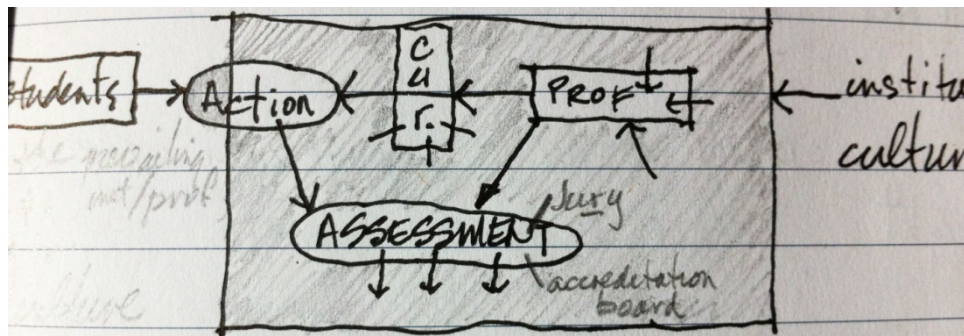


“Creative learning and teaching are more likely to happen when teachers resolve curriculum dilemmas in ways that engage students in knowledge producing processes”. (Hayes 2011)

A new teacher-student relationship that balances 3 dilemmas created by the tensions between content/process; exploration/delivery; personal/public is required.

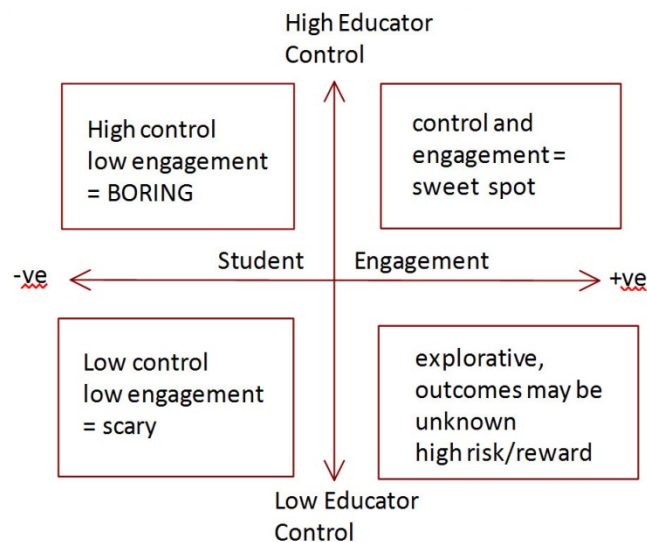
A visual diagram of this model is shown on the left.

In the traditional mechanistic model professors determine the curriculum, the required tasks, the assessment dates and evaluation criteria. Such a pedagogical model places students outside of the educational process requiring them to perform assigned tasks but not allowing them any influence on what they are asked to do or on how they will be assessed. The level of student engagement and their acceptance of personal responsibility is linked to the amount of choice and influence students have on what they are doing in the classroom. Should students be allowed more influence?



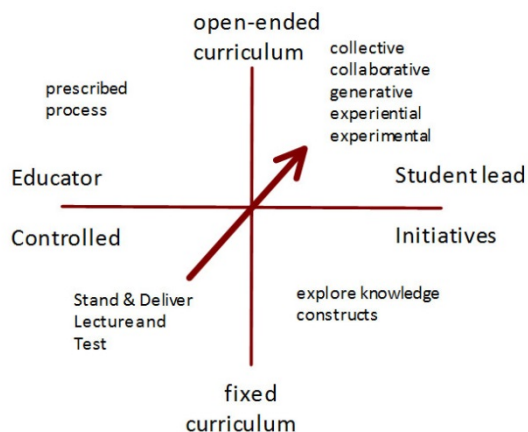
Fostering a more creative process requires a certain amount of flexibility or open-endedness in the curriculum.

Within the classroom setting, there is a delicate balance to be achieved between the need for professorial control of the pace, the focus and the desired classroom behaviours, and an equal desire for heightened student engagement. It has been shown that as teacher control increases student engagement tends to decrease so the challenge for educators is to obtain student engagement within a controlled setting. If a professor chooses to exercise less control in the classroom, then some responsibility for learning shifts to the students.



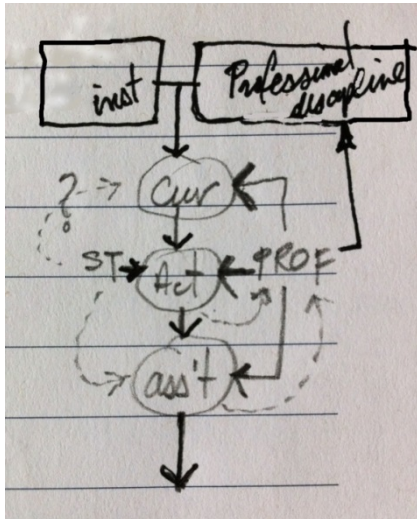
This control-engagement balancing act can be conceptualized visually in a schematic where the two tensions of student engagement and teacher control form intersecting axis. The horizontal axis assumes that high student engagement is the desired outcome and that low engagement represented by the left half of the chart is undesirable. The vertical axis is not a judgment of value but is visualized more in the extremes of the amount of control exercised by the educator with top = more controlling and the bottom = less controlling. This arrangement creates 4 quadrants with the sweet spot in the upper right.

The more exploratory processes in this model have less predictable outcomes. There are many proponents of more open ended exploratory teaching styles who believe that this is the way to encourage personal ownership, deeper learning and achieve a higher level of critical thinking.



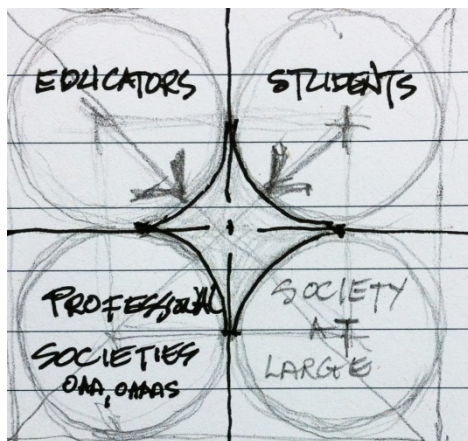
A change of perspective is required in order to accomplish this because the educator is seen as a facilitator in a student driven, explorative process rather than as a subject matter expert who is delivering a lecture. This can be more risky because end results are not always predictable however it is perceived to be more democratic which promises a more engaged audience. This may be difficult for many to achieve who do not wish to give up an entrenched position of status and power associated with the role of content expert or give up some of the control of the curriculum to students.

Creative judgment cannot be taught or exercised if students are not allowed to make significant choices. Choice requires clarity of intention which can only arise from deep personal reflection. Such reflection is the seat of experiential learning. The student-professor relationship must change in order to deepen experiential learning.



What role, if any, should the host institution and professional discipline have on shaping curriculum within an applied discipline? Usually the professor makes curriculum decisions on behalf of the profession based on personal experience as a representative of the profession. This decision making process is compromised if the professor has little or no experience in the field. There is little likelihood of the professor asking the students what they think they should be learning or how they feel that they should be assessed.

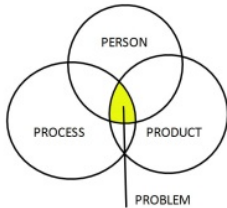
Society at large, (clients, users, neighbours) fund our architectural education systems and must live with the built consequences of the values embedded within those educational cultures. Because of this they are stakeholders in the educational system. Should they have an impact on curriculum and assessment decisions?



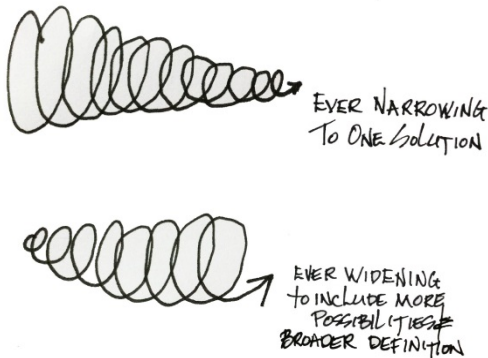
Architectural programs with hypothetical abstract problems ignore the social needs of clients and users. What happens when the discussion turns to assessment? Long considered the sole purview or responsibility of the professor, should there be any sources of outside influence? Assessment of creative output is based on the same values (hidden or explicit) that shape the curriculum, the task and the very definition of creativity. There are at least 4 stakeholders in the diagram on the left but historically it is the subjective "right" of the professor to decide what occurs in the classroom.

THE DESIGN PROCESS

"You who have chosen a profession that aims to modify the status quo are aware of this: a project is always, at the beginning, a "riddle", a complicated problem with apparently unresolvable constraints... held back by the respect for rules that limit the possible solutions. (Paolo Belardi, 2014)



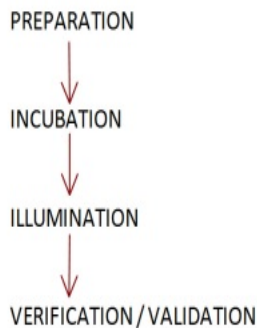
A major part of the design process then is actually problem finding. This is sometimes referred to in the studio parlance as problem definition. Design problems are usually a series of nested questions where students choose a personally meaningful approach by formulating the "right" question. In this regard, as the schematic shows, the design problem is actually part of the design process and the 3 P's become 4 P's.



"Another helpful dichotomy is the difference between convergent and divergent problems. Convergent problems compile information that leads to a single, correct answer (math problems, for example). But studio design problems are divergent—the information collected, the reflection on that information, and the application of the student's analysis to the problem at hand will lead to many solutions, some better than others, but all applicable to some degree". (Crosbie 2007)

Divergent problems keep expanding outwardly as more information is brought to bear upon the question. This additional information often suggests new directions rather than assisting in the selection of the options already under consideration. After a period of research, designers must apply their own values and beliefs in order to choose a set of *"rules that limit the possible solutions"*. This process requires reflection and documentation. For example: when asked to design a house, students may be required to choose clients, building sites, programs, sustainability issues, and visual expression (amongst many others). Each choice might suggest different house designs with the number of possible solutions increasing rather than narrowing down to a select few. As a way to reduce the number of ideas they may elect to interpret Corbu's manifesto that sees a house as *"a machine for living in"*. This would suggest machined man-made materials and industrial forms rather than natural materials and organic forms.

In his book “The Art of Thought” written way back in 1926, Graham Wallas conceived a 4 stage design process. His assumption being that completion of these steps would yield a creative product.



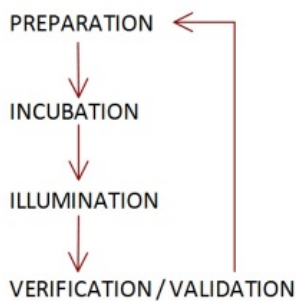
Preparation: in architectural terms we would say research, data collection, analysis and problem definition

Incubation: a period of manipulation and juxtaposition of ideas that often yield unexpected combinations “sequential reasoning through mental feedback circuits” (Belardi, 2014)

Illumination: the AHA moment, epiphany, non-hierarchical thinking

Verification / validation: checking parameters for feasibility, unpacking requirements, communicating, explaining and reflection upon the result to assess whether the problem has been adequately resolved or could be further improved.

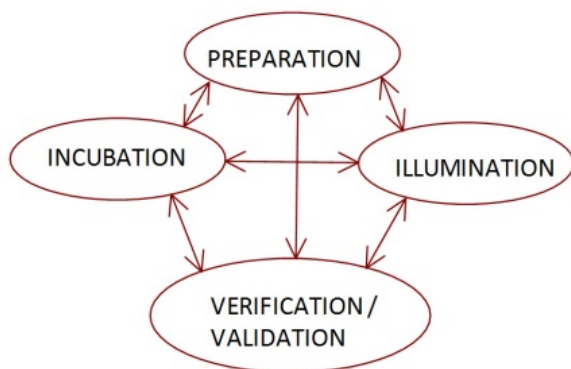
Though this seminal work has become a foundation in design process scholarship, it has been revisited by many scholars over the years. Refer to Mark Runco’s revisions below.



Recently the significant notion of recursion was added to the Wallas model (Runco, Pagnani 2011) making it a 5 step re-iterative process. See the revised model on the left.

As Belardi points out this 4-5 step process does not reflect in any way the amount of time spent in each “phase”...the old and tired adage 99% perspiration and 1% inspiration definitely applies here.

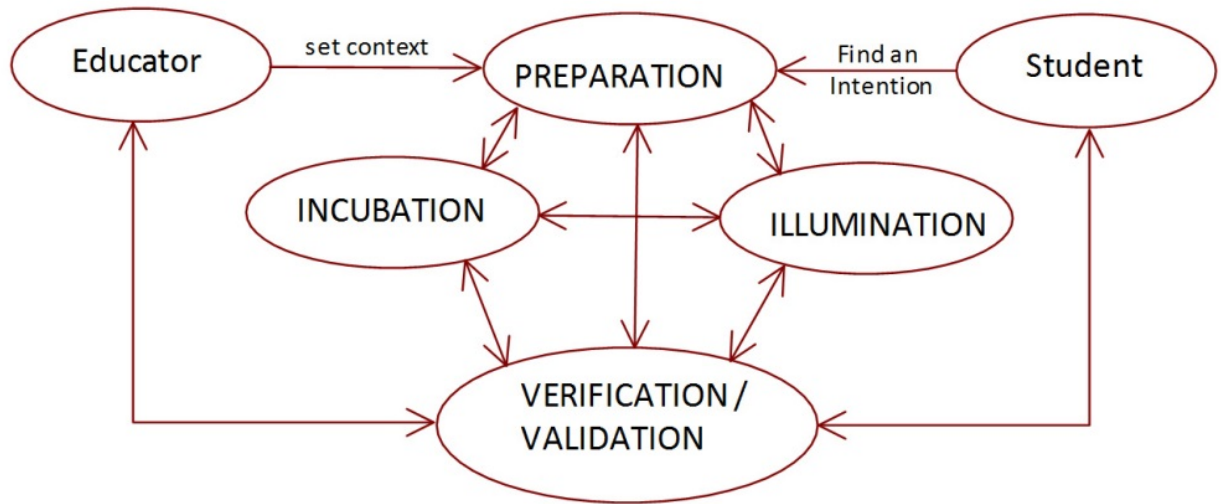
It is my experience as an architect that this process is non-linear in nature yielding a model that is more circular and network-like.



Because inspiration can happen at any time and a failure to verify a solution can kick a designer “back to the drawing board” designers can begin the process anywhere.

It is through this semiotic process we make meaning of the perceived issues and manifest our understanding and intentions within our architectural responses. Feedback loops MUST be designed into the curriculum and delivery for both faculty and students to impact the creative process and creative outcomes.

With feedback loops built into the process, Wallas’ simple design process now looks like this diagram below where you can start anywhere and go anywhere and the verification process informs best practice suggesting alternates for the next time through.



If Belardi is correct about “problem-as-riddle” and Crosbie is correct that all architectural problems are “wicked” then how do you teach/assess/evaluate such a beast of a problem?

REVISED ROLES OF EDUCATOR AND STUDENT

As stated earlier allowing students input and choice shifts responsibilities within the educational process.

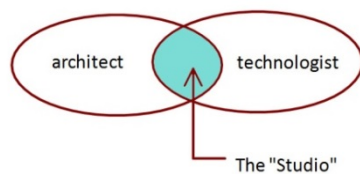
EDUCATOR ROLE	Wallas (1926)	STUDENT ROLE
Set the design problem. Define the parameters and flexibilities. Allow enough open-endedness for students to shape to their personal quest. Direct student research.	1) Preparation	Reflect on what they are asked to do. Find intrinsic motivation for the task Find and clarify a personal intention What info are you given and what is needed? Analyze local and global aspects
Observe process and offer guidance. Teach how to find, clarify and communicate a design intention. Build in time for “beginning again”.	2) Incubation	Manipulate info and variables and document the process (this needs to be taught)
Provide exemplars, relevant precedents.	3) Illumination	Find inspiration/seek the AHA! moment
Critique, assess, evaluate, grade, promote, certify, accredit. Listen to students Allow feedback and input into the evaluation process Reflect personally upon the process completed ie Did you get the result intended at outset?	4) Verification and Validation (this must be taught. if they must do it in process, why not at the end as well?)	1) Reflect formatively in-process Is this working? What is needed? 2) Reflect upon process and submissions 3) Complete a self-evaluation Were you clear about what you were trying to accomplish at the outset? Did you accomplish what you set out to do? What would make it better? 4) Contribute to assessment strategy

THE DESIGN STUDIO



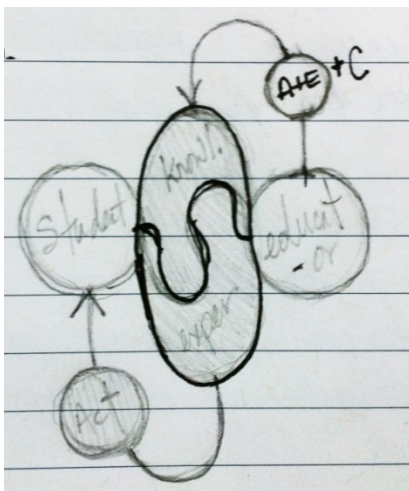
(Photo: "The Crit room" Mackintosh School of Architecture, Glasgow; Ken Snell)

"The design studio has been the centerpiece of architectural education for more than a century and a half. It was inherited from an earlier method of educating architects, the atelier, where future designers studied under a master architect in his studio. The Ecole des Beaux Arts formalized this system of education, and contemporary architecture programs continue its use. The studio—as a place and as a form of pedagogy—is so central to architectural education that most educators don't even begin to question its authority. For professors, students, and practitioners, the studio is like the air we breathe—it surrounds us, it gives us life as designers, and it is essential to our formulation as architects." (Crosbie, 2007)



Whether you come from an applied-vocational or a conceptual-abstract educational culture the design studio is common ground. (Refer to Academic Cultures in Architecture earlier on) The different academic cultures designing curriculum will determine what happens in the studio but the one commonality between all studios is the process of drawing.

In a world with an accelerating pace of obsolescence, the process of information transfer that once occurred in a "stand-and-deliver" lecture format is quickly becoming a technological process experienced online. Students snap, clip, paste, post, blog, "google", upload, download and otherwise manipulate digital data. In a standard classroom, information acquisition has more to do with finding and possessing data than remembering facts. However, the design process in the studio is about information creation within a social setting. According to Lev Vygotsky learning within the design studio is about the *"social production of meaning"*. (Vygotsky, quoted by Dezuanni and Jetnikoff, 2011)



Traditionally, it is the design studio that mediates the relationship between architectural student and their design professors. In the studio, each participant brings their own personal knowledge and experience to bear upon a design problem set by the design professor. If the power balance is not neutral, then the professor's opinions and experience usually overrides that of the student. The professor is responsible for assessment, evaluation and curriculum.

Through mimesis of the design process in an environment simulating a professional context, students perform design activities guided by the professor. In this way, students assimilate required attitudes and behaviours desired by the professional community.

If as Chris Platt says “everything around us (the design studio) has changed”, then why as Crosbie indicates above, has the design studio method proven itself to be so very resilient to change?

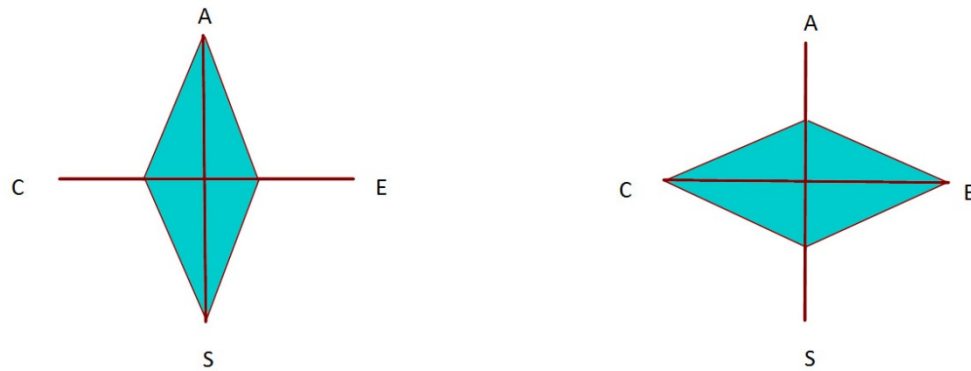


All problem based studio work is devised to cultivate 3-D visual thinkers (drawing, model building) who are computer literate and persuasive in forming an argument in defense of a chosen design approach. Even as the design studio has survived almost unchanged as the cornerstone of architectural education for 200 years as the diagram shows, everything outside the walls of the academic studio has been dramatically and irrevocably changed. The increased prevalence of computer technology in everyday life has had a massive impact on contemporary professional practice. The inscrutable resistance of the studio method to respond to these outside influences could lead to the marginalization of architects if the values of the world outside the walls of academia cannot find a place within current architectural curriculum.

Though creative demands are made of students in every course of an architectural program, it is within the design studio where everything is brought together during the building making process. *“The architectural design studio offered the ideal setting for integrating knowledge—a place where synthesis and application, reflection and action, occurred simultaneously, joining theory and praxis”*. (Boyer, Mitgang 1996 as quoted by Crosbie)

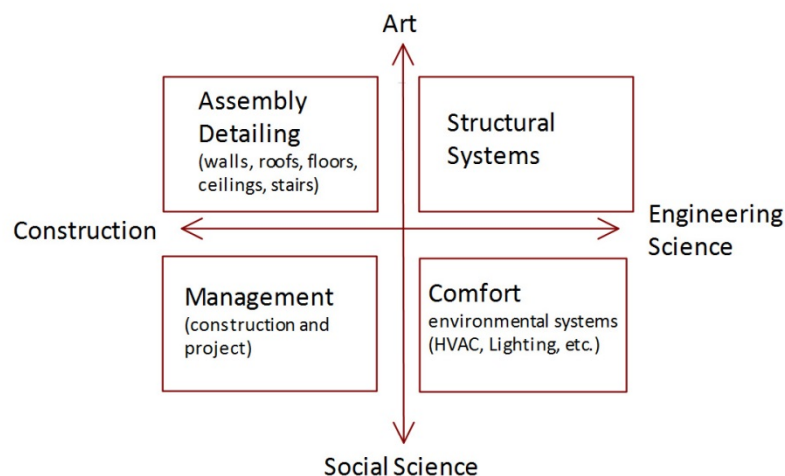
...“knowledge in any educational setting always reinforces certain ideologies, values, and assumptions about the real world so as to sustain the interests of some groups and their values at the expense of others. In this respect one must admit that educational settings—whether studios, laboratories, lecture halls, or classrooms—are not neutral sites; they are integral to social, cultural, and political relations that can be found in real life.” (Salama 2010)

Though all studio work is problem based, the answer to a design problem is usually an object of one’s own devising. As a result, the way the question is framed by the educator reflects their expected outcomes and the often unspoken or implied value system of the particular academic culture. Academic design cultures and technical design cultures frame their problems differently and have different sets of expectations and outcomes. This affects how student work is evaluated. Though there are similarities, when the built environment is viewed from only one of 4 possible lenses a design philosophy or stance creates an inherent value system and pedagogical emphasis. These different values systems determine which questions will be pursued and limits the possible solutions by dismissing the importance of other approaches. When the built environment is seen through the lens of the fine artist, or a scientist (social or physical) or that of a crafts person, design creativity is ‘pushed’ in different directions. These different lenses have huge curricular impact focusing attention on acquisition of different skill sets and information.



The image above is a visual representation different educational philosophy. The image on the left represents an emphasis on artistic and cultural principles (abstract-hypothetical) where the image on the right represents an educational philosophy which emphasizes construction methods and engineering principles (concrete-vocational). These different approaches would lead to different expectations. This can be further explained with the use of two examples.

The first example will demonstrate how different the approaches would be to the concept of sustainability. The approach of the philosophy exemplified by the image on the left would expect students to explain how notions of sustainability affect the form, space and organization of their designs. The other philosophy represented by the “kite” on the right would expect hard and fast numbers, calculations and methods for obtaining savings measured against a standard. Both approaches would demand unique concepts of equivalent levels of creative response but the solutions would be very different in nature. It is easy to fall into the old habit of ascribing a higher creativity quotient for a visually stunning image obtained from the more classically art-based exploration. However, obtaining a large and demonstrable savings in materials, energy and waste is just as creative but in a more applied way. The exemplars used as comparators would be very different. This would change the context for assessment and evaluation.

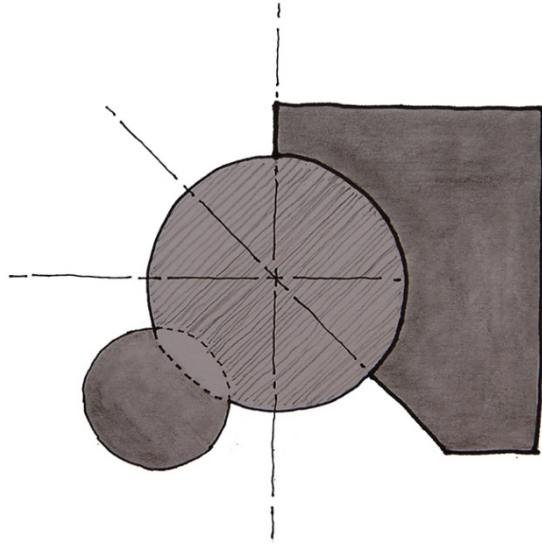


The second example examines how differently the currently fashionable concept of “materiality” would be applied. A more vocational skill based education would de-emphasize the aspects of metaphor, expression, symbolic meaning or individual expression and focus instead upon rationalization and quantification of materials of construction as they apply in the diagram to the left.

As educational practitioners reflect upon their curriculum and practice in a climate of dwindling resources, what is left out defines a school's philosophy equally as much as what is incorporated. Should a school teach Autocad? Should the quality of prepared drawings be evaluated if the method for producing the drawings is never explicitly taught? Should students be preparing working drawings or design concept drawings only? This is a major dividing line between conceptual art based schools and technical or vocational schools. Will the problem framework require students to produce a building design that is structurally sound? Will they be required to demonstrate how they intend to keep the water out and the heat in? Will they be required to integrate novel construction materials and mechanical or structural systems? Will it simply be assumed that eventually the roof and the wall will work as required or will the specific detail be considered during the design concept phase? Many educators believe that these vocational skills will be learned on the job and that if these concerns become part of the problem definition, creativity with respect to form or concept will be sacrificed. Students assimilate these values from their respective studio cultures and carry them into professional practice upon graduation. We have many buildings today that are technically challenged as a result. Some students within the conceptual schools wonder how they will get their first job without these vocational skills. Some educators with a more technical philosophy see beauty in a well-integrated, technical and functionally complete thought. Again, it is the focus (what is required and what is not) that will determine the evaluation system. In the college system (and often in professional practices) it is believed that technical concerns *do not* stifle creativity but actually encourage innovative solutions. Cost and energy efficiency concerns alone have generated many novel real world design solutions.

"Nor are studio projects devised in deliberate sequence as a structured course giving students an all-round grounding in design. But the key role of architecture in advancing towards sustainability in the emerging epoch suggests the relationship of lectures and studio work, and the nature and sequence of the design exercises, needs radical restructuring" (Peter Buchanan 2012).

"It is easy to ignore the system aspect of studio and turn it into a vehicle for promoting a faculty member's or a school's idiosyncratic opinions. Architecture schools don't realize that their design studios often lack the cohesive logical structure of an education system". (Nikos Salingaros 2009)



PART THREE

CREATIVITY CONTEXT

AND A NEW ASSESSMENT

P A R A D I G M

Assessment of Creative Learning
Relationship between Activity and Assessment
Factors for consideration when quantifying performance
Studio Thinking Framework
Evaluator Responsibilities
Assessment and the Art of Observation

ASSESSMENT OF CREATIVE LEARNING

Academic discussions regarding assessment of creativity lag behind developments in other areas of research that focus on the more topical subjects of creative teaching and learning, cognition, genius, imagination, play, and the more politically current discussions involving policy change, the role of creativity in education and the economic imperatives of competition. A contributing factor to this imbalance in research activity might be the general opinion that making art is considered to be intrinsically self-rewarding because of the *“aesthetic pleasure derived from the joy of deploying imagination in free-play towards the art object”*. (Fleming 2011) Must creativity be subjected to external measurement and reward systems implemented by others and based on their values? With assessment and evaluation of creativity so dependent on culture (values and beliefs) and upon context (prof, discipline specific pedagogy, institutional framework) any external system would appear to be very subjective. As discussed earlier, many educators believe that the requirements of an audit culture will stifle creative endeavour so assessment is not given the attention it so rightly deserves. Julian Sefton-Green has stated that many scholars don't even think of the assessment of creativity as *“a proper academic ambition and almost a contradiction of terms”*. The tide is turning as businesses and politicians view creativity less as fun or play see the possible economic value when it is hitched to enterprise.

David Boud's opinion (mentioned earlier in the introduction to this work) stands in contradiction to the above and bears repeating here. He states that *“assessment methods and requirements probably have a greater influence on how and what students learn than any other single factor. This influence may well be of greater importance than the impact of teachers or teaching materials”* (Boud 1988) If he is correct in his assessment then the development of the techniques, tools and methods for the assessment of creativity should take on a higher value. A better understanding of what is being evaluated and access to accurate assessment tools will assist in facilitating this necessary cultural change. Government policies and academic structures mean that evaluation is not an option but a requirement and this may require a shift in current attitudes and priorities. When the assessment of creativity is not an option, educators must endeavour to reduce the subjectivity in their evaluation strategies. To accomplish this we must clarify the contextual issues and create a transparent evaluation structure.

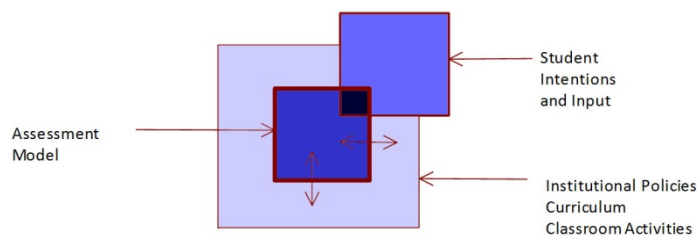
The mission is to develop new practices that are valid, rational, non-subjective and based upon the authority granted by shared values and judgments rather than on the assumed authority of traditional roles.

According to Ellis and Bars (2008) there are 6 factors or educational strands to be considered when assessing creative learning that will be evidenced in classroom performance, reflective commentary on their portfolios, and self and peer assessments... and they are:

1. confidence, independence and enjoyment (ie it should be fun)
2. **collaboration** and **communication** (verbal, oral, graphic)
3. creativity
4. strategies and skills
5. knowledge and understanding
6. **reflection** and **evaluation** (by both **self** and **peers** to develop discrimination and judgment)

These 6 strands raise many questions regarding studio practice at Sheridan.

1. Is creativity defined as an individual process and expression or a social process?
2. Is there an opportunity for students to engage in collaborative work and social meaning making?
3. Are students required to document and communicate their intentions and process?
4. Is reflective practice taught and encouraged?
5. Is reflective practice required by the curriculum or educator?
6. Is “self-evaluation” practice taught?
7. Why is peer-evaluation not valued or included in assessment structures?



THE RELATIONSHIP BETWEEN ACTIVITY AND ASSESSMENT

Let us consider 4 ways that a question might be framed in a simple lettering exercise in order to visualize the relationship between how a question is asked and what is implicitly expected. These expectations (expressed directly or implied) will determine the evaluation criteria applied.

1. Replication: Repeat this letter - exactly.

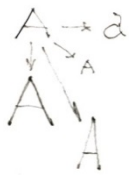


This type of prompt or question is very easy to mark with an overlay that is a standard correct answer. No variations are allowed. Is it creative though?

In North America this would not be considered to be an exercise for creative

development. In Japan however, this exercise could be considered acceptable pedagogy for developing creativity. According to Joseph Tobin (et al) Japanese teachers routinely use origami and calligraphy in their creativity exercises. *"To become a creative artist you have to first master the various kata (forms) of a dō (way or school)"*. (Tobin 2011) The creative act in this example is internal as students make internal mental adjustments necessary to replicate the required forms of the work of accepted masters. The application of this method to a North American Architectural program would require the mastery of applicable historical elements, forms, and rules before students would be allowed to extend, break or openly manipulate established forms.

2. Interpretation: Here is the letter "A", repeat it but change the scale.



In an audit culture with tight evaluation factors this could be configured as a multiple choice matching question rather than a technique for enhancing performance skills.

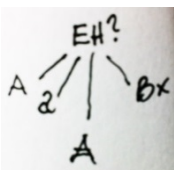
Remember Sesame Street and the game "one of these things doesn't belong"?

Multiple choice questions, though easy to mark, are recognition questions not skill

performance questions. Here any size as long as it was different from the original would be

correct. There would be a value judgment as to whether the change from majuscule to miniscule is an acceptable change of scale or not. Some might think the interpretive twist was creative.

3. Variation: Make a letter "A" of your own that is different from ALL others in the class.



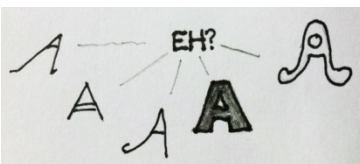
This is more open ended allowing more student input.

There are still clear boundaries.

"B's" are not allowed.

This is more culturally accepted in North America as a creative endeavour because of the pursuit of novelty. This exercise may involve research but does not require mastery of calligraphy skill before commencing. Skill development would be an alternate objective .

4. Divergent Variations: How many different "A's" can you make in 15 minutes?



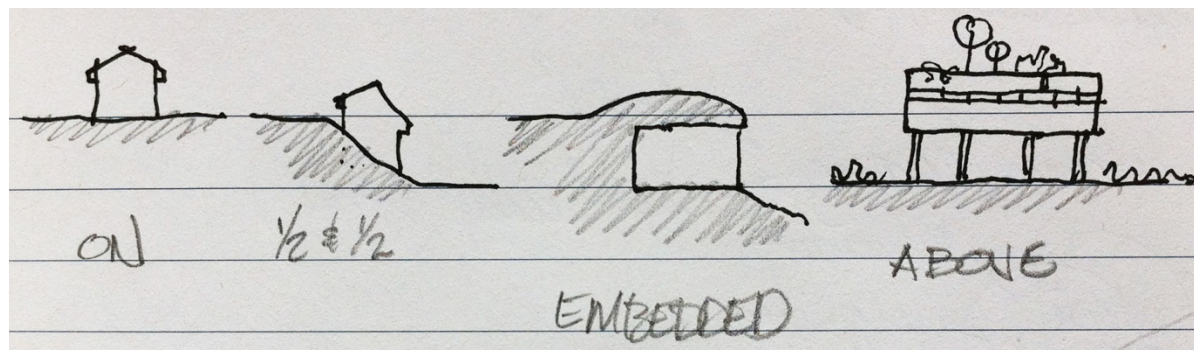
Here the number of distinct variations becomes an evaluation factor.

This exercise measures "Fluency" (about which I will speak more of later) or the ability to generate alternatives. Here there is the added

consideration of a given time frame. Drawing and thinking speeds are

entangled in the assessment and the evaluator must exercise judgment regarding the amount of variation of characteristics that is required to make a variation unique from the others produced.

An application of the divergent variations question to architectural technology is shown below. Here students are asked to visualize and represent different ways a house might touch the ground.



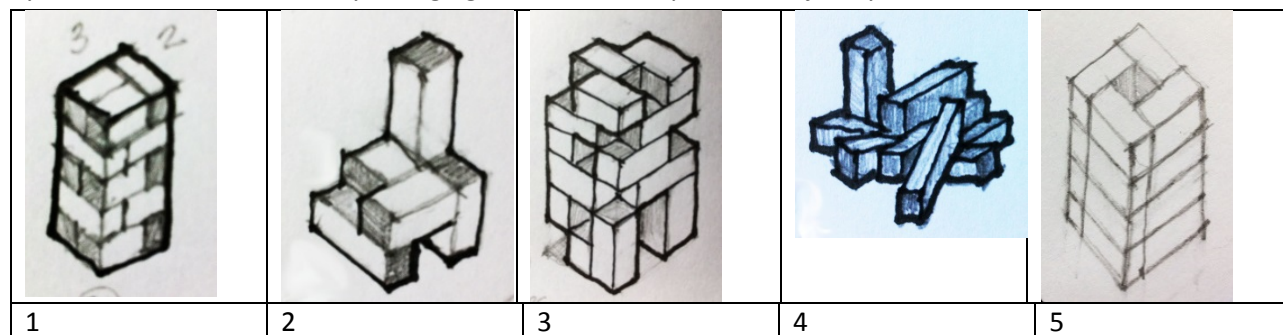
Block Play

Consider these two exercises developed from descriptions of block play at Dagan (Tobin 2011)

Task 1: Build a block model to match the image included with your set. There should be no blocks left over. (1989) In this exercise, there is a right answer and a wrong one. Though this is easy to evaluate with a yes or no response, is this the best way to develop creative thinking?

Task 2: Build whatever you like and let's see who builds the best things. (2002)

Given the imagined results below to illustrate possible compositions for discussion purposes how would you decide which is best? By changing the criteria it is possible to justify each of these as the "best".



The highest ratio of floor area to wall area would suggest selection of the least imaginative solution. (#1)

Which one is the best metaphor for "chaos"? (#4.)

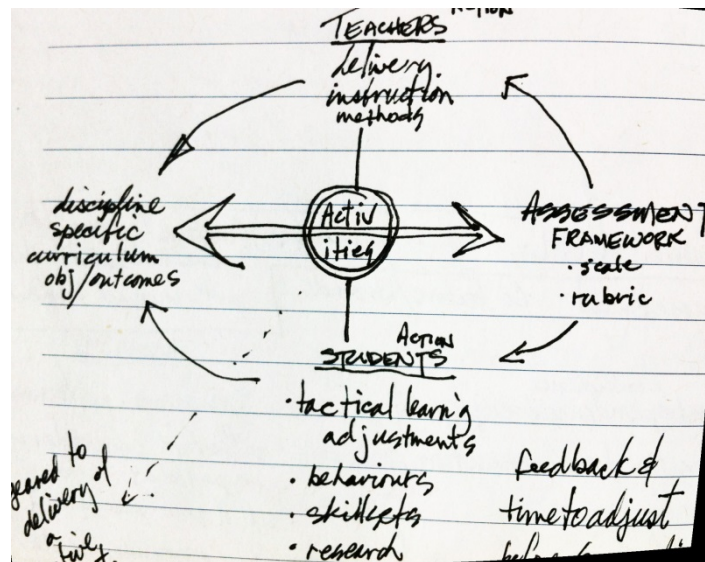
Which one would make the best apartment building giving private balconies to each unit? (#3)

Which one makes the most interesting silhouette against the sky? (#2? 4?)

Which model allows light to penetrate down through the centre? (#5)

This open-ended type of activity is often the model applied in architectural design studios. (ie. Design an apartment building for a given site) If the evaluation criteria are vague at the outset in order to encourage a wide variety of responses then students are at the mercy of the evaluation jury who can change their criteria from student to student, project to project and sometimes in mid-sentence.

Evaluation for such an open ended question without explicit parameters or clarity of expectations is very challenging.



Definitions of creative activity cannot be separated from their socio-cultural context. The way a professor frames the “design problem” will determine the focus of the activities performed by the students. This in turn will shape the assessment and the entire learning experience. What students are required to do and how they will be evaluated are inextricably linked. Students respond to the way a question is framed. Creative learning strategies often require flexibility in responses to allow freedom of exploration and individuation of responses. However, if the prompt is too open-ended,

there is no fair and consistent way to evaluate the outcomes. Should evaluations and assessments appear inconsistent to the student body then the professor risks a loss of authority.

The evaluation system/criteria should be clarified at the outset otherwise the resulting evaluations will appear to be subjectively determined and changeable based upon the biases, prejudices and preferences of the evaluator.

Creative teaching practice must begin with careful reflection upon the activities students will be required to perform and how they will be evaluated.

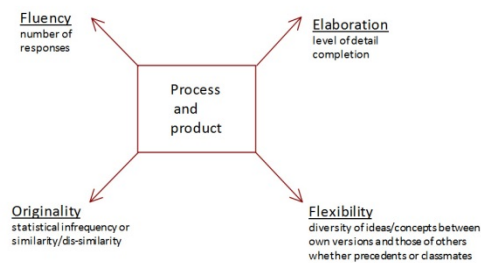
How do educators create fair assessment tools that address the shifting assessment criteria required by open-ended design questions, while encouraging and enhancing creative learning?

FACTORS FOR CONSIDERATION WHEN QUANTIFYING PERFORMANCE

Michael Crosbie is of course correct when he says that “*Architectural design continues to be a problem-solving exercise. The types of problems addressed are known as “wicked”: they are not easily defined, they are not simple (not even the “simple” ones), and it is a challenge to declare when they have really been solved*”. (Crosbie 2007) This is in part because the first step of the design process is actually problem definition or problem finding. Students must reflect, interpret and create their own intentions within the scope and context of the assigned problem. What is implied but not stated directly in the Crosbie quote above is that there is never only one solution or correct answer to any design opportunity. When there is no definitive answer, evaluation becomes very subjective. Every student produces multiple options before they develop the “best” one according to their own evaluative criteria and reflective process. Meanwhile, every evaluator will have their own personal preferences (expressed or implicit). When solutions and comparators vary, measurement yardsticks vary as well. Often winners of design competitions are not the most “creative” but they are the best match to the evaluation criteria of the jurors. Often radical ideas are criticized for being too risky or incomprehensible. This speaks again to the real role of creativity within the profession. Within a real-life context, consistency of opinions of evaluators cannot be expected and this puts fairness of evaluation in an educational context at risk. The

application of creativity has hidden boundaries that are often not expressed by the evaluator(s). Audit cultures demand numbers for comparative and promotional purposes. Such numbers often vary widely on a panel of jurists. Even if we can identify and agree upon the factors for consideration, observation and weighting remains a subjective activity.

As discussed earlier in this paper, novelty or originality alone is not a reliable marker for a creative product. It relies on a comparative context and novelty just for the sake of being different leads to undesirable side effects within an urban environment. The generation of divergent alternatives is also a



Factors for consideration when quantifying performance

sign of a creative mind. Aside from the sheer number of options (which is often infinite) the range of diversity of between these ideas is also a sign of a creative process. Sometimes the various ideas are vague in nature but sometimes they “arrive” fully detailed and well-articulated. Mark A. Runco and Alexander M. Pagnani have identified these 4 criteria as: Originality, Fluency, Elaboration, and Flexibility. (Runco, Pagnani 2011) These ideas can be shown schematically as in the diagram on the left.

Grading rubrics created using these factors still require evaluators to make judgments based on their own experience so subjectivity can only be reduced, not eliminated altogether. However, if judgments made within these headings are communicated to the students in an effort at transparency, then a valuable dialogue can begin. This takes time which is often difficult to budget. If the evaluation happens at the very end of a semester this dialogue often does not happen.

When educators only collect final drawings for evaluation, they can evaluate the finished ideas and the graphic content of the final solution they cannot make any judgments regarding fluency or flexibility or design process from a final pin-up board or poster. The creative process must be assessed in progress.

The National Advisory Committee on Creative and Cultural Education have identified 5 characteristics of imaginative activity namely: *using imagination, fashioning process, pursuing purpose, being original and judging value*. (NACCCE 1999) The use of imagination, originality and value are very culturally biased evaluative factors while the characteristics of a final product do not even make their list. Within the architectural studio, fashioning process and pursuing purpose is difficult to measure from a final drawing if the process is not documented and the intentions are not stated. Requiring the students to create a written document in addition to their drawings will engage them in a valuable reflective process. Architectural reflective writing will require them to develop an architectural vocabulary with which to verbalize their design intentions and rationale. Requiring students to document their design process will expose the fluency and diversity of their ideas. It will help them develop detail and specificity in their thinking by translating visual information (right-brained formal-spatial concepts) into language based (left-brained) conceptual ideas. This process will help them to see relationships between visual and verbal ideas and integrate them into complete wholes.

A STUDIO THINKING FRAMEWORK

Lois Hetland and Ellen Winner have created an educational model they have termed a “framework for thinking” within a studio context. (Hetland, L., Winner, E. 2011) This framework identifies five core creative qualities and eight habits of mind. They express these habits of mind as verbs or actions. They are included in the chart below for ease of writing performance outcomes. It has been my experience in real life studio practice that it is difficult to separate personal creative characteristics (genius) from desired actions or behaviours (such as creative process) from the quality of productive outcome because they are such a tightly integrated unity.

eg. When a person develops their craft through the acquisition of requisite disciplinary skills it shows in the person’s ability, technical process and in the quality of the final product. In other words, when an observant person makes astute observations and responds to them the awareness will reside in the person, be evident in the process and affect the characteristics of finished object.

They are teased apart here for the purposes of analytical investigation. The various headings and from the Hetland/Winner framework describe a matrix. By adding their general explanations/definitions you arrive at the table shown below.

A Studio Thinking Framework – Index to the Dispositions and Indicators						
8 Dispositions*	Indicators of expertise	complexity	connections	flexibility	judgment	motivation
1. develop craft		multiple simultaneous rapid succession	integrated relationships between concepts and communities	responsive varied thinking	balances subjective and inter-subjective in relation to evidence	intrinsically driven to achieve something of personal and professional significance
2. engage and persist						
3. envision						
4. express						
5. observe						
6. reflect						
7. stretch and explore						
8. understand the professional context						

*A “*Disposition*” is a “habit of mind” a personal characteristic or behaviour

Through a process of interpolation, which draws upon my studio teaching experience, I interpreted the intersection of each column and row offering comments pertaining to the low medium and high levels of expertise for each of the resulting cells as they relate to the discipline of architectural technology. The results of this process are shown in the tables on the following three pages.

A Studio Thinking Framework – Part 1- Complexity and Connections						
Indicators of expertise	complexity			connections		
	L	M	H	L	M	H
8 Dispositions*						
1. develop craft (skillful technique with tools/materials)	lacks technique / skill	moderate skill with different techniques	multiple skills / techniques	only what is already known w/o relevancy	matches s/t/mat'ls to situation	develops new skills t/t/mat'ls as needed
2. engage and persist (focused process)	straight to single conclusion	some exploration & trial stops too soon though	multiple attempts & methods	gives up quest easily & uses 1 st idea	looks for relevant precedents	finds and uses what is current
3. envision (imagine what does not yet exist)	repeats mostly known forms	a few new ideas or concepts	multiple very divergent ideas	does not reflect on relevancy to issues	imaginings similar to what they have encountered	can relate inner ideas to larger social context
4. express (ideas /feelings /meanings)	one i/f/m with little or no description	few i/f/m with poor description	multiple concepts with descriptions & intentions	does not know how their actions relate to the social context	identifies some links but weak in expressing them	fluent expression of awareness to social context
5. observe (see what is normally not visible)	works from assumption mostly - not observation	few small inconsequential observations	multiple new awareness-es	works internally w/o looking into context	draw from relevant personal experience	draws from the larger world /resources
6. reflect (question /explain /evaluate /judge)	no relevant questioning, weak ass'm't. of own decisions	insufficient questions &/or incomplete answers	introspection and self – awareness drives process	only researches the obvious with no introspection	identifies personal values & beliefs but as separate from context	connects inner /outer with personal /social
7. stretch and explore (reach beyond normal capacity)	stopped the process after finding one idea staying w/in existing talent/cap'y	reaches beyond personal experience but not very far from personal comfort zone	selected from multiple new ideas and integrated them together	used what was given with understanding	made new social connections / gained some awareness	developed many layers of understanding in new personal directions
8. understand the professional context (history, practices, exemplary work)	works from personal memory independent of fields of endeavour	seeks contextual info but may not fully grasp or implement it	knows and builds upon exemplary precedents & professional practices	does not understand architectural practices as they apply to their design	limited understanding and application of architectural practices	understands and meets professional socio-cultural expectations more broadly

*A “Disposition” is a “habit of mind” or personal characteristic or action

A Studio Thinking Framework – Part 2 - Flexibility and Judgment						
Indicators of expertise	flexibility			judgment		
	L	M	H	L	M	H
8 Dispositions*						
1. develop craft (skillful technique with tools/materials)	used a single technique with limited success needs variety	changed techniques to improve results /performance	multiple techniques executed with skill	trouble discriminating success or appropriate tools/mat'ls	aware of differences can't articulate or apply them	chooses correctly between options and can articulate rationale
2. engage and persist (focused process)	disengaged from process w/o reaching personally satisfactory resolution	token effort at multiple ideas but lacks depth or conviction	integrates many ideas tries multiple schemes then chooses best fit	continues on w/o seeing that idea or technique is not working & change is req'd	doesn't know when to stop & overworks ideas by going too far	knows when to continue and when to stop designing
3. envision (imagine what does not yet exist)	narrow interpretation of the rules & possible solutions	develops multiple ideas /approaches that are very similar to one another	changes ideas fluidly with clear distinctions until best fit is achieved	has one idea, can't see possible ways to generate alternatives	can generate many options can't discern quality or appropriateness of them	knows when to continue and when to stop developing options & which is best
4. express (ideas /feelings /meanings)	lacking an expressive "language" so cannot find expression of i/d/m's	cannot adapt ideas or expressions to make a better fit	can customize ideas to a changing context for best effect	can't find criteria for selecting best expressions	difficulty matching criteria with i/f/m under consideration	written and graphic work is meaningful.
5. observe (see what is normally not visible)	can see only from one point of view	many ideas some are out of context or inappropriate	multiple relevant insightful observations	homogeneity – no edges or boundaries to separate figure/ground	can discern objects of thought but not their transitions	observations are accurate succinct and valuable
6. reflect (question /explain /evaluate /judge)	cannot discriminate appropriateness of ideas	can tell when and why an idea isn't working	know the right question to ask	proceeds upon assumptions w/o reflecting	cannot sort relevant from irrelevant	precise questions, accurate responses
7. stretch and explore (reach beyond normal capacity)	can only see one familiar idea or process	tries multiple ideas approaches	has multiple new ideas / techniques until one is a better fit	proceeds upon assumptions using only what is given	awareness of gaps but doesn't close them with new information	knows when more info is needed and where to get it then finds relevant info and applies it
8. understand the professional context (history, practices, exemplary work)	cannot adapt "work" to fit professional context	makes adaptations once shown	moves fluidly between multiple contexts chooses best	do not know what standards or expectations exist or apply	misjudges required performance level misses often expectations	understand and accomplish a professional outcome

A Studio Thinking Framework – Part 3 - Motivation			
Indicators of expertise	motivation		
	L	M	H
8 Dispositions*			
1. develop craft (skillful technique with tools/materials)	relies on known skills or familiar t/t/m – no reaching or /exploring	tries new s/t/t/m ie skills/ techniques / tools, materials	learns how apply most appropriate s/t/t/m's even if unfamiliar at the start
2. engage and persist (focused process)	does not dedicate the required time for lack of interest gives up early & easily	extends the process but not successfully conclude it	task oriented -dedicates time & resources required to complete tasks to their level of satisfaction
3. envision (imagine what does not yet exist)	no pursuit or engagement simply goes with the first idea	develops a number of options then moves on w/o bringing to conclusion	driven to develop variations until the most suitable is known
4. express (ideas /feelings /meanings)	not concerned with accuracy of expression as long as there is "something"	effort but without thoroughness or accuracy of expression	internally motivated to communicate accurately and meaningfully
5. observe (see what is normally not visible)	opposed to looking, wants to "begin" the task with info at hand	develops some new info thru observation / analysis (will look outside the known)	exhibits self-motivated seeking behaviour develops new observations
6. reflect (question /explain /evaluate /judge)	does not pause long enough to develop individual thoughts	introspection begun but not concluded	self-generated and accurate introspection
7. stretch and explore (reach beyond normal capacity)	only uses existing knowledge and skills	will occasionally move outside of their comfort zone	develops new knowledge and skills to meet situation
8. understand the professional context (history, practices, exemplary work)	employs own set of rules in isolation of professional context	will seek outside opinions/ ideas /examples	internally driven to meet most stringent current practices

6 Phases of the Problem Solving Process			focus or " <i>habits</i> " most emphasized during the phase
1	finding	setting intentions and objectives problem definition	5-6-8
2	planning/developing process	establishing what method will be utilized	3-5-6
3	making	the actual construction phase for the "art" object or product	1-2-7
4	pushing		6-7-1
5	finishing		1-2
6	sharing		4-5-6

The "*habits*"

1) develop craft 2) engage and persist 3) envision 4) express 5) observe 6) reflect 7. stretch and explore 8) understand the professional context

EVALUATOR RESPONSIBILITIES

In the face of a “wicked” almost unresolvable design opportunity that in a “real world” context rarely ever achieves unanimous agreement from other professionals, clients or the general public, how can an educator make the required evaluations in a fair and transparent manner?

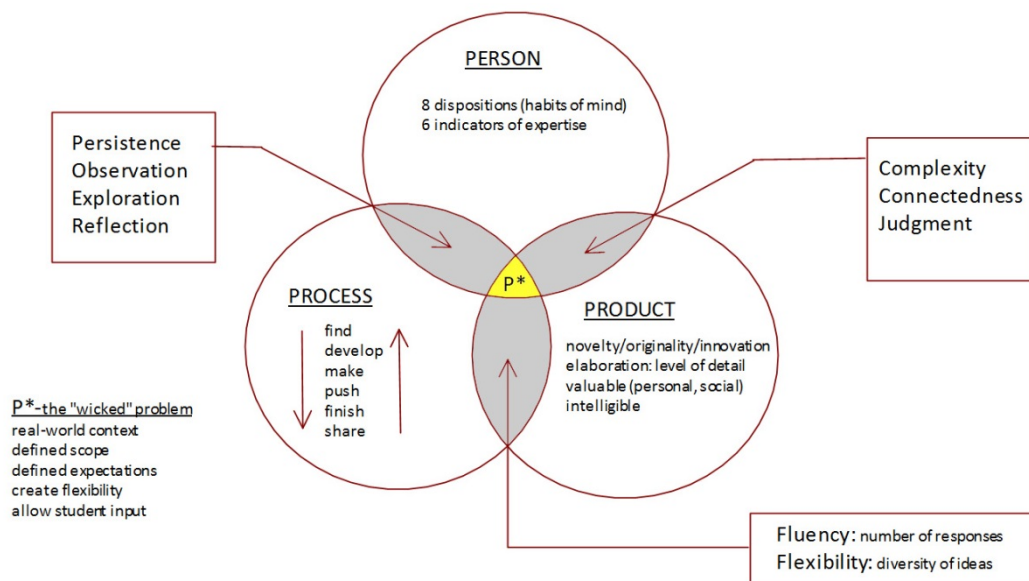
If an evaluator’s judgments are seen in any way to be hasty or subjective; obscure or inconsistent; irrelevant to student intentions or values; non-transparent, indefensible or incomprehensible in any way, then students will consider such judgments to be arbitrary. Under such circumstances discussions will never be brought to closure and the assessor’s authority will very quickly erode.

If judgments are to be defensible and transparent then evaluation criteria must be clear and upfront because students need to know how they will be evaluated before they submit.

All assessment or evaluation requires close observation, professional experience and accurate judgment. In order to make an informed observation/decision/comment an educator has a responsibility to look closely at student work. They must allow time within their process for this to occur.

No one wants to be judged against a set of values or criteria that they do not accept or acknowledge. How can an evaluator build consensus? If students are allowed some say in the problem definition and evaluation criteria they will be able to connect their own personal and cultural experiences to the required work.

When all the factors that contribute to creative activity are considered, the complexity of consistent, accurate and transparent evaluation of the creative potential of a student becomes a very complex task.



With this level of complexity, there is little wonder why many people simply “squint and point”. Consistent, accurate and transparent evaluation places many demands upon the evaluator.

Responsibilities with regard to the person

To evaluate the personal growth of a student, educators must witness the creative behaviours (indicated by the eight dispositions) and observe which of the six “habits of mind” are actually being employed by the student in the service of the design act. This requires evaluators to be very observant in order to experience the movement to higher levels of transaction, to witness a transformation and enlargement of skill sets. This process can be difficult to observe on a week to week or project to project basis. Personal habits and creative traits and behaviours develop slowly. Simply adding a line to a project’s evaluation rubric (ie creativity 5/10) will not assess this deep personally meaningful growth or provide the necessary feedback to sustain growth.

Responsibilities with regard to the process

How can evaluators observe the process when much of it happens outside the classroom or when the evaluator is called in at the last minute to serve as a guest juror or “outside eye”?

This evaluation requires students to document their process. Faculty must include this expectation at the outset and elaborate the criteria for evaluation. This will require students to reflect upon their practices. Is *reflective practice* actually taught within the program of study? Educators must be part of the design process. It cannot happen completely off campus or out of the classroom. For faculty to observe this behaviour, students must attend class to receive formative comments, guidance and elaboration. In a part-time or hybrid format this may not be achievable.

Responsibilities with regard to the product

It is incumbent upon evaluators to know the context and history of exemplary work within the professional discipline. It is also important to know the student demographic in order to set accurate and achievable expectations in order to create a balance between expected professional performance levels and the personal circumstances of the learners at the outset.

Responsibilities with regard to the problem (design opportunity)

Design problems should always be set within a real world or actual context. Faculty must establish the scope of the problem, establish the contextual parameters and set expectations for production of solutions. This is more difficult than it seems at first glance. It cannot be too open ended nor so finite as to direct students to a single solution or pathway. Flexibility, choice and personal exploration are all important factors of experiential learning. For deep personal learning to occur students need to connect the given task to their own ambitions and their personal and cultural experiences. Faculty must seek and be open to student feedback; educators must reflect upon the disparities between beginning expectations and the actual accomplishments of the students; and express a willingness to modify the required tasks and levels of performance in order to achieve a finer balance between where the student’s professional skills are currently and where they need to be at the end of the course and at the program. Curriculum design, like creative design, is a re-iterative process.

ASSESSMENT AND THE ART OF OBSERVATION

Authority that was once granted (or assumed) by a person's social station, today is something that must be actively sought and maintained because in the digital age, it can easily be undermined or lost.

In order to improve assessment practice and maintain authority and legitimacy educators today need to assure the following:

- all judgments must be defensible and transparent,
- evaluators must be ready to discuss and explain their decisions,
- to continue to build and strengthen communication skills,
- hone their observation skills,
- increase their patience and present mindedness.

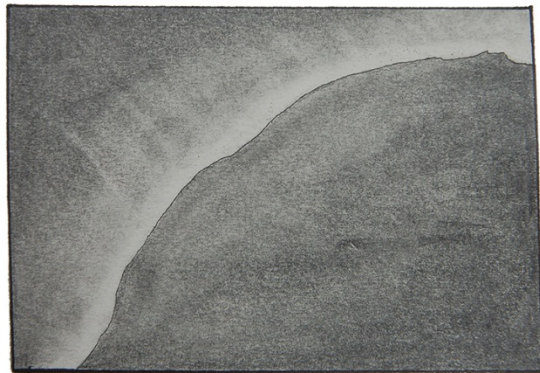
Becoming a skilled architect is very difficult. It is one of the most demanding professions and it takes a lifetime to learn how to do well. Frank Lloyd Wright was still learning when he died at the age of 92 while he was designing his famous Guggenheim Museum in New York. Yet students and educators attempt to accomplish this well enough in 3 years for them to take up a responsible role on a design team at the end of their studies.

Becoming a skilled educator is, like becoming an architect, a very difficult thing to accomplish and also takes a lifetime of practice, observation and self-reflection. Such reflection is not for the faint of heart.

Becoming a skilled teacher of architects, well now, how difficult is that? Cultivating an interest of architecture in a distracted student is very challenging. Creating something where once there was nothing, making ideas that were once invisible- visible is intrinsically creative and self-rewarding. Entire structures of knowledge can appear out of thin air...and then collapse again upon inspection, testing and peer review. Yes this is difficult. But like design where there is no singular correct process. Evaluation is a creative response to the heart of what a student is trying to do. An accurate comment, a thoughtful and respectful correction, a properly timed generating question, patience and attention, spending time with an exhausted student can fire their passion. When students witness love of architecture and a passion for teaching they MUST respond in kind. It is so difficult you must Love what you do.

Please know this: there is creativity in each of these things; making, observing, teaching, learning, collaborating and assessing. In the exercise of creativity there is joy and value. If you have managed to read this far, know that you are valued.

Ken.



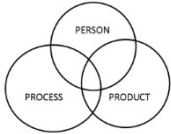
ARCHITECTURAL
C R E A T I V I T Y
IN
C O N T E X T

THE CREATIVE STEREOTYPES IN THE ARTS AND ARCHITECTURE

Creativity is Artistic

Though traditional artistic endeavours (painting, sculpting, drawing, writing, dancing, performing or composing music to name a few) are widely accepted to be creative activities art is not the only model upon which to base a definition of creativity. Much creative activity occurs outside of the classical arts. Creative problem solving is required in every discipline where one encounters novel challenges that require a unique solution.

Making



Artists, through their creative action upon the materials of their craft, give ideas physical form, making invisible concepts, visible. It is a non-scholarly platitude that creative people, engaged in creative processes, make creative objects. In effect, they create something from nothing or at least something new from something old. This is a central notion in the scholarship of creativity. Every act of making can be considered to be nominally creative.

Architecture, often described as the “Mother of all the Arts”, is accepted as a legitimate creative art form because something is created where once there was nothing. To the extent that all architectural instruction includes making, be it a line on an empty page, a drawing, a model or a building, the assumption that an architectural education is inherently creative, is partially true. It is easy to accept this premise without closer examination. But we won’t do that now, will we?

POST HOC ERGO PROPTER HOC (the fallacy of causality)

Also, there is a belief that the creative process will always yield a creative product or outcome. “*Post hoc ergo propter hoc*” assumes that “If something follows something else, then the second thing must be caused by the first thing”. Can an uncreative person, create a creative object? Can an object, considered creative be the result of a non-creative process? This notion assumes that creative objects are the result of creative processes performed by creative people. We know from lived experience that this is not always so. Sometimes creative geniuses make mundane things and sometimes, creative processes let us down. Identifying the genius or the process involved in making something does not help assessors identify creative objects. If this were true then we would not have to evaluate creativity. Evaluation and assessment of creativity is much more difficult than this.

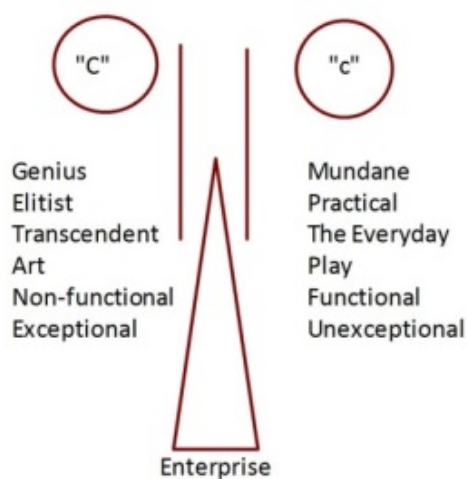
Novelty

Emanuel Kant in 1790 defined creative genius as “*the capacity for originality not imitation*”. Today this means the invention of something that has not existed before. When assessing whether an object is to be considered creative or not, often the only criteria that is applied is whether the object is considered novel or unique relative to other similar objects. This makes the teaching of architectural history critical to the creative learning process, to judgment making and to the identification of creative products and processes. A monkey can splash paint on a canvass, a computer algorithm can generate unique drawings (per Aaron by Kerzweil). There are acts of making that are repetitious (like a making a mug or bowl or a standardized suburban tract house). Though each hand-made object is unique and identifiable individually, when viewed as a whole - one compared to another, creativity is not necessarily at the forefront of the assessment of the handmade object. Uniqueness or novelty

alone is not enough to determine the level of creativity involved in making an artifact, but it is a central notion in the scholarship of creativity assessment.

Big “C”, little ‘c’ and the evolution of the definition of creativity...

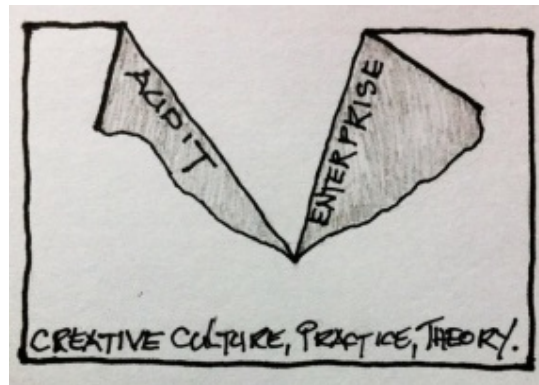
The first usage of the word “create” referred to the divine act of the genesis of the world and only God could *CREATE*. In the “romantic” 18th century with the emergence of patrons (consumers) of art other than the church, artistic endeavour was separated from religious endeavour but the creation of art retained attributes of divine inspiration. In the 19th century creativity was not reserved just for God and Artists but the definition was enlarged to include the creative acts within science and math. 20th century creativity theorists democratize what is considered “creative” attributing it to everyone and to everyday acts, not just big “A” Art. If you could make something from something else, it was considered a creative act. In 1917 a white porcelain urinal labeled “Fountain” and signed “R. Mutt” (generally thought to be Marcel Duchamp) and was installed in an art gallery as “sculpture”. It challenged existing notions regarding art and what was then considered creative. Nothing was made. Art became a concept. The creativity was in the conceptual idea not the making or the craft process. It was the thought behind it that mattered. Battle lines were drawn, skirmishes fought over what was real ART and what is just craft. These debates still influence notions of creativity today. Many theorists divide art and craft along ideas of intention (which I will return to later) and purpose (again, later). The Big “C”, little ‘c’ theoretical divide was born. In the young 21st century educational policy makers, scholars and corporations are all stakeholders in current debates regarding the role of critical thinking and creative learning in education. It is widely thought by contemporary stakeholders that education should be relevant to industry and employment and that the educational system it should produce the creative thinkers needed by the emerging creative



economy. This belief would require education to be responsive and accountable to the prevailing economic and political climate that currently sees the objective of creative scholarship as the creation of “competitive advantage”. Where the notion of Creativity was once restricted to self-motivated elitist artistic activity that was marginalized by right wing politics as a non-essential extra, this new objective integrates creativity into the realm of everyday modern life. It democratizes creativity and sees opportunity for novel inventive thinking at many levels. According to Ken Jones, the NCCCE report of 1999 *“suggests that creativity would find its most productive spaces in a new relationship to the business world”*. (Jones 2011-1)

With its emphasis on critical thinking and problem solving this “new creativity” is “harnessed to enterprise”. (Jones, 2011-2) In other words, creativity is “*about equipping people with the skills they need to lead full lives; the ability to respond creatively and confidently to changing situations and unfamiliar demands, to solve the problems and challenges they face at home, in education, at work, to make a positive contribution to the life of their communities*”. (Bentley, and Selzer, 1999)

Ken Jones in his work “Democratic Creativity” says that “*Creativity is not only a set of skills, but a modality of life*”.



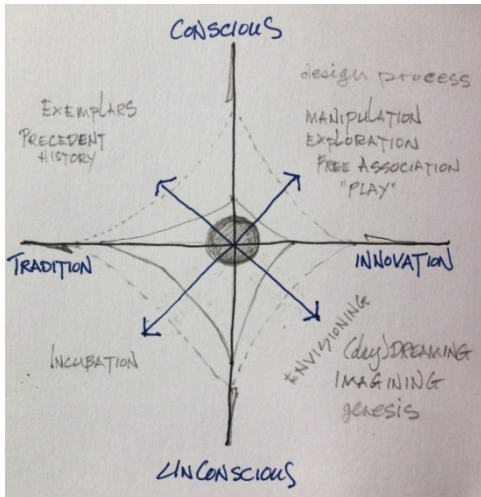
Artists and participants in creative cultures appreciate the intrinsic and personal value of studies in creativity and see no need to justify them. Enterprises preparing for the creative economy of the 21st century need employees that are: adaptable to new situations, flexible and collaborative in group settings, that are skilled critical thinkers and creative problem solvers. They look to current educational systems to deliver a skilled labour force. In a political climate that is characterized by an audit culture, pressured by dwindling funds, accountability and performance measurement, educational policy makers are returning to a focus on basics with a back to fundamentals approach that is measurable.

Educational institutions at all levels, must respond to this new context generated by the audit culture and the new demands of enterprise. As institutions move to absorb their new responsibility to develop the creative potential of their student body, and operationalize these concepts in their program offerings, contemporary definitions of just what constitutes a creative culture will necessarily change to reflect this new climate.

Creative learning discussion is no longer restricted to the topic of Big "A" "Art" or BIG "C" Creativity. We have to put creative learning to work for us. It has to earn its way and provide measurable outcomes. As educators, we now have to prove that we are delivering the promised results. We must be careful to avoid the grand general statements characteristic of the recent past which promised an improved society but could not be substantiated and focus our efforts instead upon measurable, discipline specific definitions and strategies.

The role of Culture

"Creativity in brief cannot be understood without reference to the symbolic field in which it takes place...It is precisely this dialectical relationship between inherited culture and symbolic transformation, between tradition and innovation, which marks the horizontal axis of creativity".(ABBS, 2011)

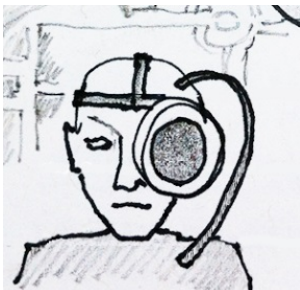


Left: A dynamic model of the Symbol making Mind (Abbs)

Koji Matsunobu and Samuel Leong in their separate studies of the influence of Japanese and Chinese societies on the arts and education believe that the way creativity is defined flows from the values and beliefs of the respective culture and that this determines what activities are considered creative.

Opposed to the Japanese tradition of adapting "self-to-the material", the North American culture of the individual would have artists adapt the "material-to-self" in an individual expression rather than in an imitative repetitive skill acquisition exercise. The contemporary North American art scene (in which architecture is included) is very indulgent toward highly personal concept pieces of low skill or craft.

"Each culture defines what aspects of creative endeavour are (and are not) preferable in a given context" (Lubart 1999) How does this cultural definition of creativity impact upon the education of architects in North America? What we believe to be creative, affects what we in our separate cultures value and honour. By extension these values and beliefs will influence our pedagogy. How a faculty of architecture position themselves within this framework will determine their definition of creativity, what activities the students will perform and how they will be evaluated.



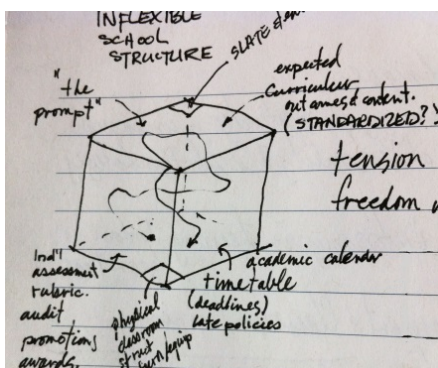
Chris Platt (Professor at Mackintosh Architecture at the GSA) claims that much about education regards "instilling values, qualities and aspiration". In other words, it is about acclimatizing students to the rigours, behavioural expectations and performance standards of the respective culture within which they work.

"Resistance is futile. You will be assimilated". (Borg, 1975)

However, you usually get to choose.

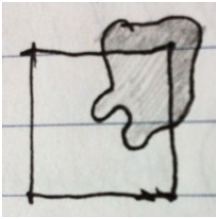
"Resistance is not futile"? (Hugh, 1976)

Then choose.



"Creative" cultures and "Audit" cultures are often considered to be antithetical to one another. It is generally believed that creative cultures shun intellectual boxes and seek open ended questions that are self-motivating and of intrinsic personal value. Answers to open-ended questions are challenging to evaluate effectively. It is generally believed that audit cultures impose unwanted limitations to open-endedness with their requirements for accountability and strict timelines.

What happens when students step outside of an imposed rigid academic structure or timelines?



- What happens if the incubation period takes too long?
- What happens if the illuminating idea occurs late in the process?
- What happens if re-thinking a problem leads to a last minute total re-boot?
- What happens when completed details contradict the last minute better idea?
- Should better last minute ideas always be pursued?
- Are we simply measuring the speed of a student's problem solving process?

Educational institutions are unusual social organizations because they possess both of these seemingly opposed cultures within them. They are part audit culture because of their role in accreditation and certification and because of their very strict procedural demands like performance standards, policies, assessment rubrics, class schedules and time restrictions. It is often believed by those within the creative culture of an institution that the creative design process is too intuitive to be subject to testing, assessment and provision of evidence. Also, some educators believe that in order to accomplish a creative classroom we need to depart completely from the audit culture in which it is embedded.

Contrary to the myth that accountability and measurability restrict creativity, many restrictive programmatic design constraints actually inspire unique approaches and design solutions. The answer is not to shun assessment altogether but to find innovative learning opportunities and evaluation techniques within tight budgets, fixed schedules, and sometimes inflexible classroom structures. There is much scholarly research regarding creative learning and much debate regarding the role of creative education but the more pressing practical question facing educators is

"How will you know if you have accomplished what you set out to do with your creative curriculum if you do not have an equally creative assessment regime"?

New assessment models are urgently needed because assessment underpins academic activity and content in the classroom. The development of architectural pedagogy, curriculum activities and assessment practices form an often uncomfortable, disjointed unity that is non-sequential process. Only after many iterations of the delivery of a course can the necessary adjustments can be made to achieve finer resolution and resolve the tensions between the competing values of the disparate audit and creative cultures.

To many outside observers, schools that teach design of the built environment often appear to be the same in their nature. To the extent that they all have "studio" based learning focused on creative problem solving, this is somewhat true. However, design education is not as homogenous or unified as it may seem at first glance. Just as there is often a split between creative and audit cultures, there are deep irreconcilable divisions within the architectural education and design professions that fragment this seemingly unified field into diverse sub-cultures.

Discussion of these internal cultural divisions and their impact upon architectural education follows next.

Academic Cultures in Architecture

Contrary to popular belief, architectural academic culture is not monolithic in nature but fractured into different domains. The values and beliefs (whether articulated or implied) of these “domain contexts” will determine what is considered to be “worthy” and what is considered to be “marginal” or unimportant within narrowly defined jurisdictional limits.

*“Creative learning is significant imaginative achievement as evidenced in the creation of new knowledge as determined by the imaginative insight of the person or persons responsible and judged by appropriate observers to be both **original** and of **value** as situated in different **domain contexts**”...*(Craft, Cremin, Burnard 2008).

There are many separate cultures existing within the built environment educational domain. They differentiate themselves based upon the self-definition of their roles, responsibilities and tasks. Each discipline has a professional body (ie OAA, OAAAS, AATO), separate registration and recruitment regimes, membership, social events, awards and rigorous professional development programs. In other words, each has developed a unique culture with clear but separate intentions and clearly demarcated jurisdictional boundaries. The roles and responsibilities are provincially mandated and tightly defined by legislation. These discipline specific professional bodies have a great impact on educational curriculum through the professional accreditation process.

The most fundamental question within architectural education in the last 100 years speaks to the desired relationship between the professional practice disciplines and the educational institutions of today. The desired relationship with the chosen profession will determine the balance between abstract/hypothetical versus concrete/practical issues and whether or not the design problems are set within real time and space with actual clients and address real social issues.

Some educators believe that contemporary architectural education regards the creation of “*versatile problem solvers that are adaptable and flexible and able to survive in many professional contexts*” upon graduation. (Gloster; Gloster and Platt, 2014) These graduates would have more generalized knowledge and be capable of learning job specific skills quickly on the job, whichever job they choose. The emphasis here would be the development of transferrable skills. Chris Platt seems to speak for a very broad set of educators when he says that students should be “*ready to learn on the job, not job ready*” (Platt, Gloster and Platt, 2014). They do not see the role of an architectural education to be that of “vocational training” and dismiss vocationally oriented programs as non-poetic, non-creative.

Other educators believe that “*if there is a poor match between education and practice then professional practices cannot find qualified staff and graduates are not qualified for the jobs that are available*”(Mori; Gloster and Platt, 2014). Curriculum arising from this belief will be designed to mirror practice and foster the development of professional skills which prepare students to immediately take up expected roles within their field.

Modernist architecture (late 20th century) like its related discipline, modern art, was heavily invested in concept and less invested in execution. Much of today’s 21st century architecture also takes its cue from contemporary art practices. “*Probably the most frequent complaint about the latter is the over-emphasis on concept – as consistent with postmodern art and architecture’s central concern being the representation of some theoretical position, concept or scenario*”. (Buchanan 2012) These concepts are often very personal, arbitrarily chosen and often without any attention to craft. This approach comes with great risk and many educators see this approach as fuel to the debate regarding the marginalization of the architectural profession within the design and construction field.

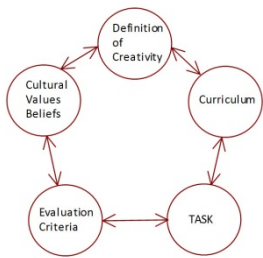
“Contemporary architectural academia is worried that the authority of science would impose absolute restraints on form, thus ending design creativity as we know it”. (Nikos Salingaros 2009)

*“A considerable number of design instructors view architecture as an **art** of making, not as an **act** of making...creativity is defined in terms of creating, inventing, and manipulating formal configurations. Creativity in this sense is limited to only intuition and talent” (Salama, 2009).*

“It is clear to many observers that today’s schools are not preparing students to function in the real world. Most design studios do not foster a more holistic architectural education that promotes a collaborative, innovative attitude to design, and which is combined with cutting edge technical competence. That, however, ought to be their primary purpose” (Nikos Salingaros 2009).

Educators can agree that much of an architectural education is *“about instilling values, qualities and aspiration”* (Platt; Gloster and Platt, 2014) and yet they can only agree upon a “loose” set of qualities or characteristics of a creative practitioner. It is evident that the definition of what comprises creative endeavour will vary depending on specific values within the various sub-cultures within the design disciplines.

When creativity is put into the service of the task at hand, the nature of the chosen task will change the way we define creativity. By extension then, this will change how and what educators believe should be evaluated. This becomes a two directional self-fulfilling and self-perpetuating educational merry-go-round. See the image left.

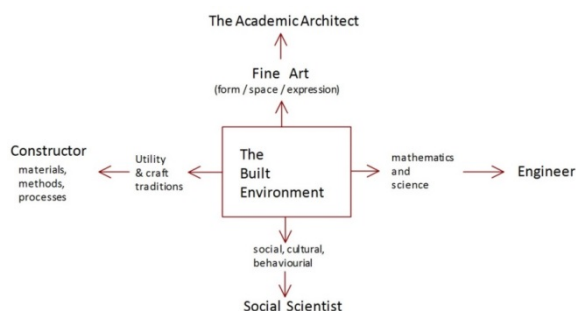


In curriculum driven pedagogy where the values and beliefs of a particular culture define what comprises creative endeavour then extrapolates that definition into curriculum decisions which determine the required design tasks and hence the evaluation criteria thereby inducing a clock-wise rotation on the wheel to the left. Pedagogy designed to engender certain “desired qualities” in a student uses the values and beliefs of the culture to define how students will be evaluated (identifying the desired traits, characteristics, behaviours that need to be evidenced and

witnessed) which then generates the required tasks that are selected to encourage the development of these desired qualities which will then drive curriculum choices that will in turn define what this culture considers to be creative endeavour thus inducing a counter-clockwise motion on the wheel to the left. When graduates of any system are re-absorbed into the institution by assuming professorial roles, the culture is maintained and even reinforced.

Conceptual Frameworks Describing Disparate Architectural Cultures

Architecture is a very complex and continually evolving profession. There is no standard educational curriculum because each self-defining philosophy arises out of their respective individual culture. All education has limitations on available resources. It is difficult to “cover all the ground” in the limited time available. Choices



must be made. It is logical that educators teach from their strength. This can be interpreted as “teach what they know”. Personal experience will guide decisions about what is in, and equally importantly, it will determine what is left out. When curriculum designers place the built environment into the centre of a knowledge structure with related skills and topics next to this centre and contemporary professional disciplines in the next “ring” radiating outward, the very curious and informative diagram left emerges. It shows that as you step

further away from the centre, particular philosophical stances and viewpoints emerge. Within this philosophical context four subject disciplines can be distinguished. It is easy to see how curriculum would vary according to the culture responsible for designing it and how disagreements about the various desired roles of education evolve.

The inclusion of science into an art based program would assist in decision making but it would also place limits on personal design freedom. Buildings enclose social activities and help define culture. The inclusion of social, environmental, behavioural or cognitive psychology concepts into a construction, engineering or art based curriculum complicates the evaluation of building performance by expanding the definition of function. There are many programs founded upon the values arising from the culture of making / building / craft. If you intend to build the design rather than leave it in the realm of concept art, then questions regarding materials and assemblies, construction methods/processes and cost must be added to the curriculum design. Many schools simply de-value and often omit these topics.

<i>Psychology</i> <i>Intentionality</i> Delight <i>Psychology:</i> <i>of perception</i> <i>of creativity</i> <i>Depth psychology</i> <i>Developmental psychology</i> <i>Phenomenology</i>	Individual	<i>Biology</i> <i>Behaviour</i> Commodity Function
Subjective		Objective
<i>Architectural history (evolution of styles and culture)</i> <i>Theories of aesthetics, proportion and property</i> <i>Semiotics</i> <i>Symbolism, ritual, myth</i> <i>Anthropology</i> <i>Cultural studies</i> <i>Proscenics</i> <i>Hermeneutics</i> <i>Cultural development: Spiral Dynamics, multiculturalism</i>		<i>Architectural history (development of technology, economic means etc)</i> <i>Environmental history</i> <i>Ecology</i> <i>Social psychology</i> <i>Principles of structures and services</i> <i>Computer skills (including predictive and parametric modelling)</i> <i>Site management</i> <i>Lean and green component manufacture</i> <i>Building systems interface</i> <i>Systems thinking</i> <i>Finance</i> <i>Business management</i> <i>Professional conduct</i>
Decorum <i>Culture</i> <i>World view</i>	Collective	Firmness <i>Systems: technical, social and ecological</i>

In his essay “*The big Re-think Part 9: Rethinking Architectural Education*” published in the Architectural Review in 2012, Peter Buchanan (using the ancient Vitruvian triad of firmness-commodity-delight) has created another structural model that attempts to re-balance essential architectural knowledge. It does not sacrifice art or creativity concerns to the demands of enterprise or the needs of professional practice. In his conceptualization two axis (one horizontal and the other vertical) are formed by diametric opposites. The vertical axis is based upon the individual versus collective learning where knowledge creation happens to either one person or within a group of students working collaboratively. The horizontal axis is the subjective – objective polarity. These tensions create 4 quadrants as described below”:

Delight (subjective-individual) This quadrant is the emotionally charged domain of the aesthetic experience which includes

thoughts and feelings that are highly personalized.

Commodity (objective – individual) In this quadrant are the behaviours and characteristics that are externally observable as “personal facts”

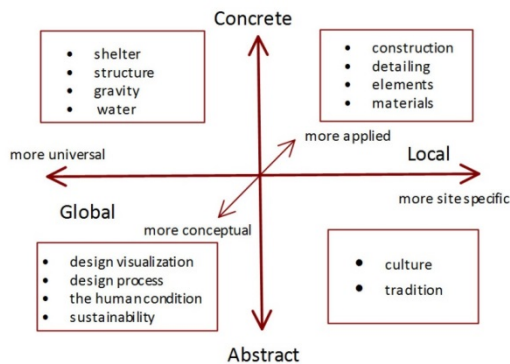
Firmness (external – collective) This is the domain of shared facts (or intellectual systems) that make up our truths and science and their constructions

Decorum (internal – collective) this is the domain of not always definable or observable

As noted previously tensions exist between the hypothetical / abstract and the concrete / practical but also there is also tension between the proper balance of universally applicable knowledge, information and

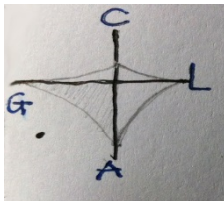
processes and those that would be more locally applicable. These tensions could be described by the model on the left.

The resolution or balancing of these tensions will also be culturally based.



Ideally, architectural educators would desire a perfectly symmetrical kite centered over the intersection of these axes indicating a perfect balance in all for quadrants and no over-emphasis in any one direction. However, to learn everything along these two opposing axes would require a lifetime of study and many educators believe that there are many things regarding

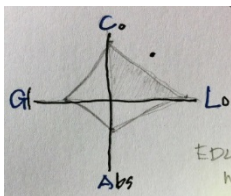
the practice of architecture that cannot be learned in an academic setting and can only be learned in practice so they are omitted from the curriculum design skewing the kite shape according to curricular emphasis.



The Global-Abstract “Know-why” Culture

This culture emphasizes fundamental abstract art based themes focusing curriculum decisions on universally applicable principles and laws. This type of architectural education is conceptual in nature and focuses less on vocational skill acquisition and

more on the general humanities. It is the opposite of the more applied vocational educational culture. It would situate itself within the lower left quadrant of the model shown above. Here the emphasis would be on problem finding. The particular emphasis of such a school would be oriented towards solving “What are we doing and why” problems with a strong emphasis on formulating the correct question. Here design concepts show forms, spaces and organizations to resolve their personal interpretation of the design problem. The types of design problems encountered within a conceptual learning context would have a more global focus usually dealing with problems that face humanity in general or dealing with issues that regard “the human condition”. The deeper we sink into a conceptual approach, the easier it is to overlook or undervalue building performance. As a result, our buildings and public spaces become geometric abstractions that are less practical. This often leads to the alienation of a segment of the general public that cannot place value on something they have difficulty understanding. Recently the architectural profession becomes marginalized by personal ego driven design process.



The Concrete-Local “Know-how” Culture

The curriculum decisions made by this culture focus education on skills required within the context of professional practice. As a result, it is more applied and focused on skills based vocational training. It places less value on the art based know-why curriculum and situates itself within the upper right quadrant of the model. The particular problem solving

emphasis of such a school would be oriented towards solving the “how are we going to do this” question. This type of education would emphasize the architectural elements/components, construction processes and the application of design concepts. Valued solutions would include structural and technical ideas/drawings and a site specific focus. This attitude defines creativity as the inventive, innovative application of materials to

technical situations and less importance is placed upon generating unique built forms. In this approach, much is taken for granted or assumed and building design begins at a different starting point than in an art based practice. In today's techno-scientific professional world it is entirely possible that *"technology can solve problems or perform functions without a clear understanding of why it works"* (OECD 2000). There are many successful modern buildings that arise from tight economical, functional or programmatic needs that are resolved by the application of new technology without ever pondering why or what they are doing. The drawback of this approach is that it may lead to less flamboyant architecture that could be considered risky or extravagant.

The models included above are not the only attempts to identify different cultural viewpoints within the architectural profession. In the earlier work of Jakobson, Ashraf Salama has identified six ideologies that generate different cultural values. Each of these cultures would define creativity differently based upon their expectations. I have used the work of these two educational thinkers to find 6 different possible definitions for creativity. I have labeled them creative modalities. (see appendix 2, Fig. 2.1)

In his work *Transformative Pedagogy* (Salama 2009) , Dr. Salama also identifies 5 possible professional role models with their associated attitudes and characteristics. I have added a column on the right showing my personal interpretation (*) of how their attitudes, characteristics, focus of interest, self-defined roles and what they value, will affect how they may define and apply creative practice. (see appendix 2, Fig.2.2)

From this work there is evidence suggesting that design professionals, through their own roles, experience and expectations, see the role of creativity within an architectural education very differently. If there were an equal mix of these varying opinions in every school, perhaps a common definition of the role of creativity in education and the role of education within the profession could be achievable. However, through collegial processes and hiring practices institutions soon identify, adopt and eventually market their own individual educational culture and reflect it in their curriculum, the required student tasks, performance expectations, and evaluation strategies. The role of the assigned task is the direction that this discussion will turn next.

The role of the Assigned Task (A.K.A. the "Design Challenge")

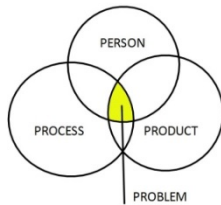
Creativity, like an abandoned building, is just an empty shell if it is not linked to a purpose. Detached from an explicit purpose, creative activity becomes random, highly personal, inaccessible and disconnected from day to day life. According to Grant Wiggins *"Creative learning is about producing work that is unique, valued and solves a particular issue"* and students *"need a goal or a destination because without purpose, there is no learning"* (Wiggins, 2011). It is the task that establishes the learning context. It drives curriculum decisions, sets priorities, sequences delivery and determines appropriate evaluation and assessment strategies. The early establishment of the task and the context at the outset will require *"clever use of the content by students as an outcome"* (Wiggins, 2011).

Lev Vygotsky has said that *"creativity, fantasy and imagination are goal directed and socially mediated"* behaviours where *"fantasy comes forward as a basic function"*. (quoted by Dezuanni and Jetnikoff 2011) Creative people are curious about the way things work and they continually generate questions regarding their own experiences. These questions become catalysts for explorative action which results in the generation of new knowledge. To quote Vygotsky again *"creativity is the social production of meaning"*. How creativity is "directed" depends a great deal upon the given context: the predilections and preferences; values and expectations of a culture. It is the contention here that the creative process is *goal directed behaviour*.

Though students produce floor plans in every studio around the world, what is included in them and what is omitted from them varies greatly depending on the performance expectations of faculty, how they ask the question, what the exemplars or comparators are and what the evaluation criteria will be. Scale, level of detail, notations, hatching, grid lines or even the presence or suggestion of structure will indicate the value system of the evaluator.

The 4 P's:

The streams of current scholarship on creativity that are particularly relevant to this study fall into 4 main topics of interest and they all begin with a letter "P" hence (P-P-P-P or the 4 P's)



The creative person

These studies tend to have a social and psychological basis and focus on the exceptional individual, their capabilities and characteristics. Applications of this scholarship imply that if these traits or qualities can be fostered in students, then their output will become more creative as well...this research follows the logic that "creative people make creative things".

The generative questions here are: What are the desired traits of creative genius and how can an educational institute foster their development?

The creative process

These studies are usually cognitive and behavioural in nature and focus on creative thought processes and problem solving techniques like lateral thinking, brainstorming or green light sessions. Application of this scholarship implies that there are steps in a process that can be followed to increase creative potential. The risk here is that it implies that there is a toolkit or a recipe that can be taught, implemented and the result will be a creative. If there is a method, then it can be packaged, traded, marketed and sold. The mysterious creative process is reduced to a step by step or paint-by-numbers commodity.

The generative question here is: Is there a recipe or process that can be taught that will guarantee a creative outcome or at least improve a student's creative potential?

The creative product

This topic of interest identifies the desired traits or characteristics of any creative output regardless of its form or media. It assumes that creative objects embody creativity and are expressive manifestations of it. Application of this scholarship assists in the creation of scholarly assessment tools. Clarifying the desired outcomes informs the making process and assists in the definition of the problem/issue.

The generative question here is: What is a creative output? How can it be identified and assessed?

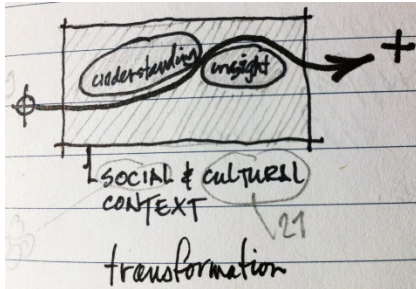
The creative problem

There is a stream of research that identifies context as a major impact upon the creative process and its resultant output. In normal usage within the creative studies context refers to the environment, social context, parenting, personal and cultural experience. Context within this paper and within the discipline of Architectural technology assumes a goal directed behaviour and is interpreted here to mean the task, the challenge, or the puzzle.

The generative question here is: How does an educator structure a curriculum, investigation or design problem that will challenge and inspire students, allow enough flexibility in interpretation for a margin of creative scope and yet not be so open ended that it cannot be assessed?

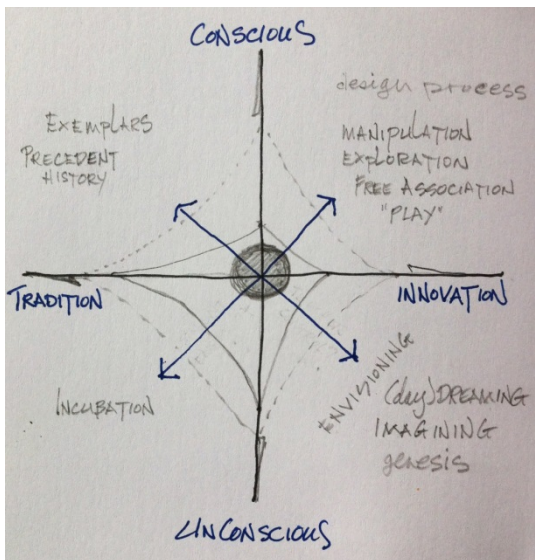
Transformation, Metaphor and meaning making...

The human mind is constantly absorbing, comparing, measuring, assembling, discriminating, sorting, juxtaposing, and sequencing information. Human beings are constantly attempting to attribute cause to sensory input. We search for explanations for our “butterflies” for example, as a feeling of fear, guilt or love that is connected to our current body state. This process of changing sensory stimulus to an imaginative construct is how we make meaning of the world. According to Grant Wiggins it was Piaget who said “*to understand is to invent*”. (Wiggins, 2011)



A mental shift is integral to almost all acts of invention and information changes “state”. The “dreamer” begins a narrative journey in one “place” and through a series of leaps of imagination ends up in another place altogether. This arrival at another place implies movement that can be experienced variously as transcendence, transformation or the genesis of new knowledge or the re-organization of existing information. The prefix “TRANS” means “across” ie

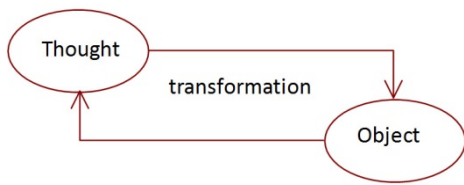
transform (change form), transition (movement from one state to another), transaction (exchange), translate (movement across language barriers). The prefix “RE” means “do again” as in repetition, re-think, re-cognition, re-invention, re-view, re-vision, re-create, or re-structure. This creative movement is represented graphically in



the Dynamic model of the Symbol making Mind diagram below. According to the diagram’s inventor, Peter Abbs “*Creativity in brief cannot be understood without reference to the symbolic field in which it takes place...It is precisely this dialectical relationship between inherited culture and symbolic transformation, between tradition and innovation which marks the horizontal axis of creativity*”. The diagonal lines that run through the centre of the intersecting axis illustrate this creative movement. Such mental activity can be conscious or unconscious but it is not without context...”*originality can only have meaning in terms of the origin of the debt, adaptations and transformations made possible by the material of the received culture*”. (Abbs 2011)

The incorporation of new information into existing paradigms is described by Peter Abbs as follows “*no creation without tradition (symbols and precedents with which to manipulate) and no transformation without continuous internalization of conventions*”...

I do not believe that creativity only results from an artistic endeavour, defined here by Peter Abbs as the “*Conversion of impulse and feeling and mood into symbolic form*” but that creativity works equally well in reverse as an aesthetic experience.



The experience of movement from thought to object making would be interpreted as giving visual form to an idea, or giving a visual image to a set of words where the reverse shown in the diagram left would be interpreted as finding thoughts, emotions or words to express encountered visual imagery. Such mental transformations can connect very dissimilar objects together by binding them to a

subjective idea, common theme or related concept. These object-to-concept transformations, or aesthetic experiences, reverse the normal creative concept-to-object making process employed by artists. In the opinion of this author, as the diagram shows transformations in either direction are equally creative.

Artistic Endeavour

The most widely accepted creative activity occurs within the traditional arts. (ie painting, sculpting) The end result is the making of an 'art' object (nothing to something, idea to form). If the maker is considered "artistic" or a "creative genius" then generally the object will be accepted as a creative product, regardless of or in spite of the process. Also, what generally separates the art object from the craft object is the intention of the maker. Craft objects are usually functional or utilitarian (vase, furniture etc.) where the art object is considered expressive of an idea or emotion. Artists employ metaphor to embody meaning in their constructions. Here an idea and a process will result in a creative object.

Aesthetic Experience

A generally less accepted however no less creative act occurs when a person encounters an object of art.

"Viewing art represents a unique aesthetic experience that is visceral and embodied rather than intellectual" (Bell 1993)

"Art has the power to inspire and transform by enabling the viewer to transcend their everyday concerns and emotions" (Belfiore, 2011)

Observers, upon encountering an artistic work, receive sensory stimulus and creatively construct an internal image or multi-sensory impression which is then interpreted.

"Looking at art is essentially a cognitive activity analogous to deciphering a text". (Barthes 1977)

An aesthetic experience is an attempt to make meaning. When "art" emotionally or intellectually stimulates an observer a state of mind may be provoked where in the viewer's thinking reflects the thinking of the artist during the making process. The viewer beholds the object, its form and colour and is captivated by it. This may raise the question "How was this made?" and trigger a search for the process. It may also trigger the question "Why would anyone do this?" or "What is the artist trying to say?" It is the contention of the author that the pursuit of answers to these questions is a creative process equal to, but the reverse of, the making process which attempts to answer the question "How do I express this or that idea?"

This "aesthetic experience" is an act of creation.

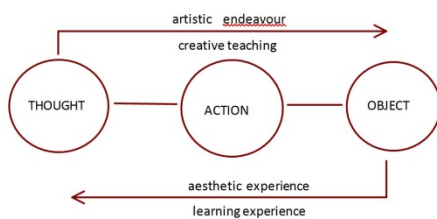
Creative Teaching

The skillful unveiling of ideas also reveals the art of teaching.

Just as an artist brings an idea to form or creates something from nothing or makes a previously invisible concept visible to an audience; creative teaching will seed new concepts in a fertile mind or re-organize existing concepts into a new logical structure. The art in teaching is the creation of learning events that stimulate an aesthetic experience within the observing students.

Creative Learning

The art of learning is visible when learners re-arrange existing thought structures accumulated through years of



lived experience into new organizations in order to accommodate new ideas. If the aesthetic experience can be accepted as the reverse of the artistic endeavour and the creative teaching experience considered creative in that it is similar to the artistic endeavour, then the reverse of creative teaching, creative learning, is also a creative activity. Students encounter new material, ideas, and objects. They interact with them from a base within their own curiosity while speculating upon their

meaning. This speculation stimulates a transformative experience and something will arise “seemingly” from nothing. In this model, learning is not an object handed to the students by the educator. Here students are seen as “*active constructors of meaning with teachers as facilitators who engage the students in the learning process, sparking their curiosity, improving the quality of their thinking and increasing their disposition to learn*”. (Watkins 2003) Students are required to observe closely; to form their own ideas and interpretations; to reflect upon contextual information and concepts to question their original beginning assumptions. This is a variation of the aesthetic experience: Think, Analyze, Reflect.

The similarity between these 4 modes of creative thinking is the act of **transformation**. It is the central thesis of this author that the process of transformation of perceptions into a conceptual thoughts (ie the creation of a metaphor from an object) is as equally creative as the traditional artistic creating of an object from an idea.

Any of these transformative acts generate information that can be considered “cultural capital”. This new knowledge has value for both the individual and for society at large. The National Advisory Committee on Creative and Cultural Education (NCCCE) has stated that “*the engine of cultural change is the human capacity for creative thought and action*” therefore educators should not limit their definition of creativity to traditional (Big “C”) activities but accept that any imaginative transformation as a creative act.

“Creativity is not solely a mental process but is defined and valued according to the social and historical context in which a creative idea is made manifest”. (Anderson, Milbrandt 2005)

The next consideration then logically will be what transformation means to the discipline of architectural technology.

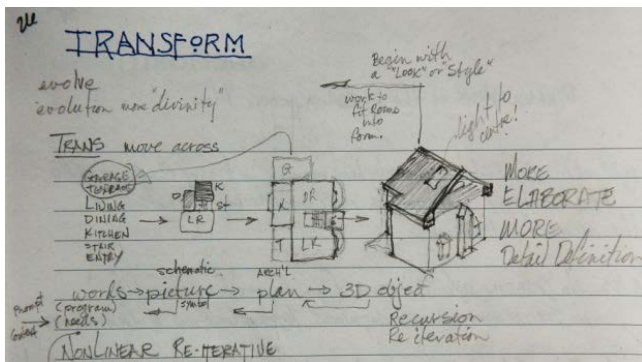
Defining Creativity within the Architectural Discipline

Because the creative process is *goal directed behaviour*, talk of creative characteristics or creative processes is empty rhetoric, like the shell of an abandoned building, if it is not linked to purpose, function and context. How creativity is directed exposes the values and expectations of a specific academic culture. Architectural design is about “*bringing into being what is not yet*”. (Pope 2011) Architecture is about changing (*transforming*) the physical, social and cultural nature of our cities, public spaces and buildings. This requires thinkers to see clearly what already exists but also to imagine possible alternatives.

“What imagination does is to enable the mind to represent images and ideas of what is not actually present to the senses. It can refer to the capacity to predict, plan and foresee possible future consequences. In short, imagination is the capacity to conceive possible (or impossible) worlds that lie beyond this time and place” (Fisher and Williams 2004)

For students in the field of architectural technology this “seeing beyond this time and place” delivers up images of possible forms and spaces that do not yet exist and suggests narratives for imagined lives. The act of drawing becomes an explorative tool for accessing possible solutions, forms, lifestyles and behaviours.

“Imagining possible outcomes, reactions, futures is central to learning”. (Dezuanni, Jetnikoff 2011)



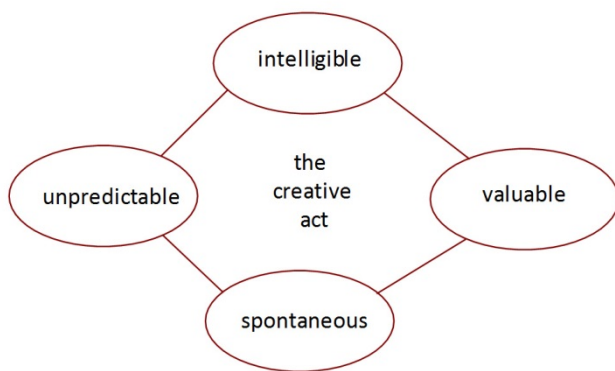
Architectural design hitches intention to purpose in a conscious, visually recordable fashion. One visual recording device is a freehand sketch but design is not limited to that alone. *“Sketching must be used to translate an idea out of a state of mere will, especially if the sketch is drawn impulsively as the real time transcription of unconsciously accumulated energy”* (Belardi, 2014)

In the diagram above, ideas about dwelling generate a list of required rooms that is transformed into visual form as an organized schematic plan showing the desired relationships between the required rooms and the outside. This is then translated into a two dimensional floor plan which then can be projected into three dimensions. Each step in the process shown here represents a *transformation* of existing information and is therefore by this definition considered to be a creative act because it represents the invention of new knowledge.

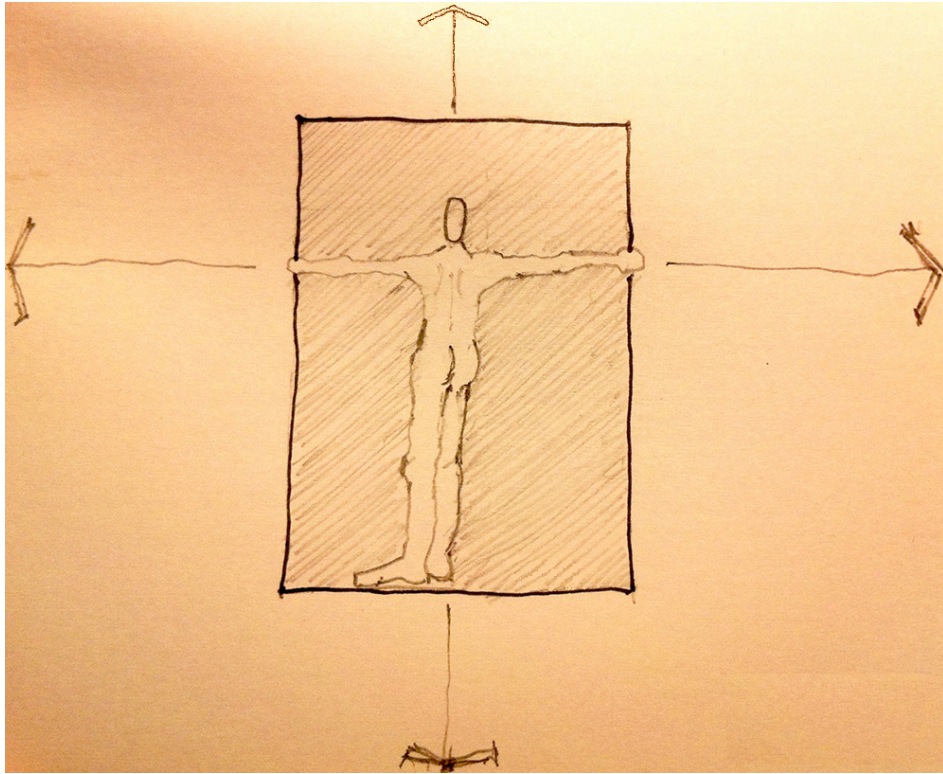
What distinguishes architectural visions from utopian or dystopian science fiction is the intention. Architectural ideas are intended to be implemented, built, and occupied. This implies the need of other professional skill sets like engineering, construction, project management and interpersonal relations. As a result, in architecture, creative problem solving should not be limited to just the conception of ideas but should, in its fullest sense, be expanded to include the problem solving purposes that employ these other skills as well. Unfortunately, creative applications with respect to solving these issues are often considered to be peripheral. As a result these creative endeavours are usually ascribed a lower creative value than that of artistic conceptualization and creativity with respect to solving these problems is often omitted from artistic curriculum.

When creativity is viewed as a *transformation of ideas from one state to another* then many activities become creative as well such as:

- see one thing as if it were another (ie house as shell, set, metaphor, memory)
- to make a new “whole” from previously unrelated component parts
- to see the unified whole and the many component parts simultaneously
- understand the relationship between the whole and its parts
- experience the differences and the similarities between things simultaneously
- the flexibility to move back and forth between the difference and similarity, motion and stillness
- the ability to find the edges or boundaries of a form, a concept, a thing and be able to extract it from its background content
- the ability to discover what is determinant and what is dependent and to use this analysis to take apart an “organization” (in its broadest sense) and reassemble it into a higher order pattern
- *adaptive novelty: using what you know flexibly in novel situations* (Whiske, 1998)
- the ability to see opportunities or new social options (new organizational structures, modified relationships, behavioural changes) to difficult interpersonal situations.



Creativity, imagination and fantasy are goal directed and socially mediated activities. Artistic processes and creative teaching make the invisible, visible. Both give form, organization and structure to ideas. They transform abstract concepts into concrete objects and objects into ideas. Products of creative thinking are intelligible, unpredictable, spontaneous and most importantly, valuable to both the creative individual and to society at large.



PART 4 SUMMATION

CONCLUDING REMARKS

APPENDICES

BIBLIOGRAPHY

CONCLUDING REMARKS

Through mimetic action in a socially and culturally charged context students internalize knowledge generated during the process of problem solving. This knowledge will guide their future professional judgments. This necessitates that the context generating such knowledge be alive (relevant) contain a multitude of voices and be safe enough to encourage explorative risk taking. It also requires that the actions performed during the exploration reflect current professional praxis.

Architectural academics have long been comfortable in their silos, working on problems and issues that interest themselves personally. When private thoughts or concerns become too abstract, arcane or personal or too remote from daily life and general experience architects risk being marginalized. There is much in contemporary art today that suffers the same fate in that their work becomes inaccessible to the general public and unrelated to the viewer's own experience. (in architectural practice substitute user for viewer) Educators can think about semiotics, myth, culture and their relationship to building architectural forms and spaces but that academic practice bears little resemblance to actual professional practices of today who are actually building cities and engaging local cultures one site specific project at a time. In the fast paced technologically explosive field of architectural pedagogy it is very difficult to maintain one's own expertise, authority and dare I say "status" so we stick to topics in which we are already expert. This can create academic and institutional inertia. Academic structures that do not prepare students for life after work are ultimately unsustainable. We do our students a dis-service when we train them to be rugged, individualistic heroes or "starchitects" when much valuable meaningful innovative and collaborative work can be accomplished with little regard to personal artistic conceptual vision but a close attention to place, energy, resources, materials and craftsmanship. Creative innovation adds to the knowledge wealth of 21st century society and requires much needed vocational skills. Elite architectural schools of the future will focus on the deliverance of these technical skills to prepare graduates for their creative and meaningful participation in the 99% of building and construction rather than the 1% of the available work that is deeply conceptual and highly personal. It is my personal belief that the audit culture with its allocation of meager resources for what it determines to be non-essential and its focus on accountability and "jobs-jobs-jobs" will greatly influence the assessment of academic outcomes and force creative cultures to change their definitions of creativity. As this paper has pointed out, this process has already begun.

Once value is attached to innovation (when has it not?) and the competitive advantage that comes with it, definitions of creativity will be hitched to production /task/ purpose. Curricular activities in schools will need to be relevant and skill based. Institutions will need to demonstrate that they are accomplishing these objectives. New scholarly research into pertinent assessment methods is urgently needed to accompany these educational changes and our academic institutions into the 21st century.

Now, some 3 decades after the first release of Autocad, BIM technologies have dominated the marketplace and are having a profound impact upon the profession and the process of the work. Architectural projects that once required a team of 10-12 draftspersons in the 1970's can now be accomplished by one or two people. Today's technologists, instead of being just one of many on a production team, are now in control of the model as part of a large multi-disciplinary team. Decisions

are made at break-neck speed in a collaborative process of construction and sharing of the co-ordinating model. The lone heroic architect as prime consultant and individualistic conceptualizer is all but a thing of the past. If architectural education is still mired in the philosophy, culture and values of the '70's, then it is sadly out of date. If architectural educational practice continues down this path established by the modernist movement, with its skewed value system, there is a very real danger that architecture will become more and more about less and less until the academic knowledge developed in the design studio has no application whatsoever to current professional practice. In the opinion of this writer, that would be a shame and a loss for all who care about the built environment. In my opinion, architectural education should be removed from isolated academic silos and returned to the street where the buildings, their users and the consumers of architecture reside.

APPENDIX 1 EDUCATIONAL ORGANIZATIONS CALLING FOR EDUCATIONAL REFORM

There are many organizations today promoting change within the discipline of Architectural education. With so much interest by the stakeholders in architectural education it is clear that the status quo of the profession is under substantial pressure. Some are listed below:

1. OECD (Organization for Economic Co-operation and Development)
2. NCCCE (National Advisory Committee on Creative and Cultural Education)
3. AIA (American Institute of Architects)
4. AR – The Architectural Review (journal based in U.K. with an international presence in 130 countries worldwide)
5. CACB (Canadian Architectural Certification Board) and CALA (Canadian Architectural Licensing Authorities) and CCUSA (Canadian Council of University Schools of Architecture)
6. ACSA (Association of Collegiate Schools of Architecture) but for Polytechnic University of Puerto Rico, all institutions are in Canada or USA (mostly). Sheridan is not eligible for membership.
7. NCARB - National Council of Architectural Registration Boards (U.S.A.)
8. NAAB - National Architectural Accrediting Board (U.S.A.)
9. IJAR - International Journal of Architectural Research (based in)
10. UKAERG - United Kingdom Architectural Education Review Group
11. EAAE - European Association for Architectural Education)

Architectural education is being re-envisioned in the U.K., U.S.A., Canada, Netherlands and the EU. Evidence of these clarion calls for change can be found in the following reports:

1. Organization for Economic Cooperation and Development

The OECD identified new pressures upon the educational systems due the approaching “Learning Economy” more than a decade ago in their report *“Knowledge management in the Learning Society”* (2000). It stated the educational systems must adapt to social change and competition from knowledge producers and mediators by defining a new role for schools or else they would face marginalization. These adaptations should:

- prepare students for a professional life characterized rapid change where learning by doing and learning in interaction with others is crucial for economic success.
- acknowledge that slower learners need stronger foundations
- adult life-long learning is the key

Innovation, because it is new, *“adds to knowledge and embodies economic value”*. A technical education, geared towards generating innovative thinking and production, is a way for students to participate in the knowledge economy.

2) National Advisory Committee on Creative and Cultural Education.

The (NACCCE) in the United Kingdom defined creative education as *“forms of education that develop young people’s capacities for original ideas and action”* and defined cultural education as *“forms of education that enable people to engage positively with the growing complexity and diversity of social*

values and ways of life". They also identified that the engine driving cultural change is *"the human capacity for creative thought and action"*.

This report identified that the business community in the U.K. wants education to

- give a much higher priority to promoting young people's creative abilities;
- developing teamwork, social skills and powers of communication.

The key message of this report is the need for a new balance in education: in setting national priorities; in the structure and organization of the school curriculum; in methods of teaching and assessment; in relationships between schools and other agencies. Over a number of years, the balance of education, in this author's view, has been lost.

3) The Boyer Report in the USA.

Ernest L. Boyer was commissioned by the Carnegie Foundation to perform an independent study of the profession of architecture by the AIA and its collateral organizations: the American Institute of Architecture Students (AIAS), the National Conference of Architectural Registration Boards (NCARB), the National Architectural Accrediting Board (NAAB), and the Association of Collegiate Schools of Architecture (ACSA). This study culminated with the publication of *"Building Community: A New Future for Architecture Education and Practice"* usually referred to as simply the Boyer Report.

The report offers a blueprint for improving the nation's built environment by proposing changes in the education of architects and the public. It calls for renewed focus on the public benefits of architecture—the creation and preservation of wholesome neighborhoods, safe streets, productive workplaces, a clean environment, and cohesive communities. It claims that at the core of the profession is public trust. If architects and those who educate them *"drift too far from this trust, they risk earning the contempt—or, even worse, indifference—of the public"*.

The report makes further significant recommendations relevant to this discussion:

1. Alternative approaches to evaluation of design projects should be more vigorously explored (p. 95).
2. Students and faculty alike should regard civic activism as an essential part of scholarship (p. 133).
3. Students should recognize the professional and ethical importance of civic engagement in their own lives and such behavior ought to govern the day-to-day conduct of each faculty member and the school as a whole. (p. 134).

4) AR - The Architectural Review

"The Big Re-Think Part 9: Rethinking Architectural Education" In 2012 the architectural journal AR invited Peter Buchanan to publish 12 linked articles entitled *"The Big Re-Think"*

Yet to visit many architectural schools is to enter a time warp where the 'anything goes' postmodern relativism of the 1980s persists, and tutors and lecturers pursue their own interests regardless of any larger relevance.

It resists the Big Picture thinking necessary to understand where we are in evolutionary and historical terms – essential to gaining insight into the problems we face and their potential solutions – and the developmental modes of 21st-century thinking and their science-based strategies of action. Besides bringing about the increasing irrelevance of architectural discourse, it has dramatically narrowed its concerns.

theory courses tend to be irrelevant and taught by people with a limited grasp of architecture and even less ability to discern quality

Patent nonsense by starchitects escapes censure. Probably the most frequent complaint about the latter is the over-emphasis on concept – as consistent with postmodern art and architecture’s central concern being the representation of some theoretical position, concept or scenario.

For a visiting critic to point out flaws in a concept is seen as inhibiting a student’s creativity. Rather than relevance, what is sought is startling originality, no matter how spurious.

Nor are studio projects devised in deliberate sequence as a structured course giving students an all-round grounding in design. But the key role of architecture in advancing towards sustainability in the emerging epoch suggests the relationship of lectures and studio work, and the nature and sequence of the design exercises, needs radical restructuring.

5. NCARB

The National Council of Architectural Registration Boards in the U.S.A. has recently put forward the “Licensure at Graduation Initiative” that would tightly integrate the profession and the educational institutions and greatly impact upon education of architects in the USA. They recently initiated a proposal to “design and develop an integrated path leading to licensure at graduation encompassing the NCARB requirements of education, experience, and examination” - [See more](#)

APPENDIX 2 IDEOLOGIES ROLE MODELS AND CREATIVE MODALITIES

The ideologies of the Utopian, Humanist and Activist lead to a questioning of the existing social order where, the ideologies of the Scientist, Bureaucrat and Liberal are more likely to lead them to accept and work within the existing/prevaling social order.

	Ideological Concern	Professional Attitude	Planning Goal	Planning Method	Validating Measure	Implementation method	*Creative Modality
Elitist	Utopian	dogmatic missionary	ideal society	deterministic design	uniqueness novelty	convincing proselytizing	novelty, visionary
	Scientific	scientific absolutist	predictable society	technological forecasting	exactitude (measurability and accuracy)	scientific methods and procedures	inventive discovery
	Humanistic	humanist philosophical	better society	intellectual conjecture	logic of purpose	educational dialogue	rhetorical argument
Populist	Bureaucratic	cautious traditional	orderly society	adaptive integration	conformity to norms	policy initiation	consensus building
	Activism	classic liberal	new society	interpretive advocacy	urgency of cause	political activism	generate attention to provoke change
	Liberalism	democratic reformist	just society	deliberative rationalization	majority vote	democratic process	articulate attitudes & values

Fig. 2.1 Basic Ideologies Jakobson 1970 (referenced by Salama, 2009)

Below is a table developed by A.M. Salama (Salama, 2009) showing various role models he has identified with their associated attitudes and characteristics. I have added a column on the right showing my personal interpretation (*) of how their attitudes, characteristics, focus of interest, self-defined roles and what they value, will affect how they may define and apply creative practice.

Role Model	Attitudes	Characteristics	*Application / Interpretation of Creativity
Egoist	motivated by personal not social values / issues	paternalistic subjective	designing unique forms
Pragmatist	accepting of social values and the problem as given	entrepreneurial	find efficiencies in materials/processes/practices
Facilitator	involved in a process of problem definition	interpreter processor	design process for achieving consensus
Technical Consultant	focused on application of mat'ls not process, construction not social values / needs	concrete, rational	inventive applications of materials/assemblies/const.
Advocate	more involved in problem definition less interested in specifics of how it will be solved	articulate political representative and organizer	designing organizations and processes for achieving change

Fig. 2.2 Role Models based upon work by A.M. Salama (Salama, 2009)

APPENDIX 3 THE BIG DEBATE

A common debate today over the role of education in architecture extends recurrent themes and discontent experienced by past generations of educators. When students (or faculty) find themselves within a culture where their values or beliefs are not reflected in what it is that they are learning or teaching their creative contribution is not recognized and they look critically at the organization from an outsiders point of view.

Students spend a great deal of time, money and effort on their education and many want direct relevancy to their objectives, not “transferable” skills. They want to know that upon completion of their education there is a place for them within the profession.

Many students share a concern that an architectural education designed to prepare them for the role of “architect” (which cannot happen until they obtain a professional license) will leave them unprepared to compete for their first job as an architect’s assistant when they graduate. This first job requires another skill set entirely than the set promoted during their schooling to become an architect. The problem with the “*ready to learn on the job, not job ready*” art based approach to curriculum design and creativity is that a graduate needs that first job. Why is it assumed that graduates can learn working drawing and computer skills on the job but not how to be an architect? Why can you only learn that in school? Is there an expiry date for personal growth and creativity? The argument has come full circle back to the beginning where we find pedagogical decisions and definitions of creativity to be based upon cultural values and beliefs. What you teach and what you leave to be learned on the job?

There are many educators today that have taken up the challenge to deliver skill laden, job ready graduates to the marketplace and have designed architectural curriculum to develop the requisite practical skills. Julia Robinson (Professor of Architecture, College of Design, University of Minnesota) has identified “*the need for rigorous research on studio teaching that engages issues of description and evaluation so that we can know what instructional techniques are worth pursuing in what context*” (Robinson, 2001).

Though the generation of very large conceptual ideas is often assumed to be more creative than technically based design, it is the contention of this author that creativity has as big a role to play in the design of a curtain wall system or the resolution of a structural frame as it does in the conceptual design of an overall building form.

APPENDIX 4 APPLICATION TO STUDIO TWO

Re-thinking studio 2: *Rationale.*

As schools of Architecture anticipate the approaching “Learning Economy” predicted by the OECD more than a decade ago, they seek change with the intended objective of “*making schooling more exciting, relevant, challenging and dynamic and personally rewarding learning experiences and opportunities*” (Julian Sefton-Green, 2011) that will give students a competitive advantage and allow them to contribute meaningfully in the design and re-construction of our cities.

The implementation of the Sheridan “Get Creative” initiative into the architectural program is an opportunity to review current studio practices. This is not a matter of simply adding a line in the final assessment rubric for “creativity”- 10 marks. Sheridan policy requires that educational topics be evaluated to be considered a learning outcome. Currently, enhancing creativity (both process and product) is not a listed learning outcome of ARCH 28544. The inclusion of this outcome in the course outline will have profound implications on the syllabus, curriculum, delivery methods, activities and assessments. Faculty will need to reach a consensus regarding a definition of creativity and how it will be demonstrated in the classroom by both students and faculty.

According to the OECD, if educational systems do not adapt to social change and growing competition from knowledge producers (ie Autodesk, VR etc.) and mediators (AATO, OAAAS, MMAH through the BCIN testing and OBC) by defining a new role for schools they face marginalization.

These adaptations should:

- Prepare students for a professional life characterized by rapid change where learning by doing and learning in interaction with others is crucial for economic success.
- Acknowledge that a person who learns at a slower pace needs a stronger foundation, more time and increased supports.

It is the contention here that one of the purposes of a technical education is the generation of innovative thinking and production as a way for students to participate in this new knowledge economy. Innovation, because it is the creation of something new, “*adds to knowledge and embodies economic value*”. This is a very different definition than the usual “*cultivation of individual creative genius*”. It leads us to a different set of values, beliefs and behaviours. The culture of a technical school underpins the very definition of creative work and its value.

Recent History

Over the past 25 years the studio 2 residential project is has grown immensely in complexity. In the 1990's students hand drafted their individual designs. The projects were simple programmatically (ie single family residences) and all students worked on the same project site with the same project zoning requirements. They had 16 weeks to create a design, build a physical model and submit working drawings that included framing and electrical diagrams, plumbing fixtures and HVAC layouts.

Since then the number of weeks in an academic semester has been reduced to 14. (a 12.5% reduction) and the number of students in a class has increased from 18-20 to the "new ideal" size of between 30 and 35 and the curriculum has expanded with new items being added such as:

- 2 point perspective cover pages (may use computer software or freehand techniques)
- Working drawings are performed using autocad high production drafting techniques. (must be cadd proficient in order to keep up the production pace)
- The design program has been expanded programmatically to include a "second unit" for rental income making the project more complex with regard to local zoning regulations.
- Legislation (both building and planning) has grown immensely in complexity.
- The project must now be LEED certified. (the entire LEED residential content is added)
- Designs have become more complex as a result of LEED inclusion with regard to green roofs, mechanical needs, solar energy applications and increased insulation/energy reduction requirements.
- Designs must include rain screen wall systems (either brick, PEIFS or wood siding)
- An exam week has been added to the semester meaning that the projects must be completed in week 13 further reducing the available time to complete the project work.
- Students are expected to meet detailed Mississauga Building department submission standards.
- Final drawings sets are plotted on a communal plotter. (more learning, more co-ordination required and more time...effectively students must stop design work in week 12 for plotting so they effectively lose another week of design time)
- We now propose the addition of the study of creativity and creative process.

In tandem with the curriculum expansion there have been a number of demographic shifts and program changes that affect student production capabilities as well such as:

- The number of international students has increased therefore the number of students for whom English is not their first language is increasing as well. Yes there is a minimum entry requirement for English but conversational English and Technical English (ie. stud, truss, articulation have very different meanings within architectural technology)
- The number of students straight out of high school has diminished. This means the student population is increasing in age, fewer are living at home with their parents while increasing numbers have increasing responsibilities outside of the school (ie young families, primary income earner)
- The number of students attending on a part time basis and the number of students working outside the school on part-time or full-time employment while attending school has greatly increased.
- ARCH 17991 (Architectural Detailing 1: residential) which was a supporting course for Studio 2 has been moved to semester 1 from its linked and supporting role. Some of the burden of that content has been shifted to Studio 2.

Effectively, over the last 25 years, the curriculum content has *expanded* dramatically while the time available has been *reduced* by approximately 25%. The result is that this course has become so complex it cannot be effectively taught to the desired depth within the time limits and resources available. Though many students after years of professional experience may eventually lead a residential project team, when enrolled in studio 2 they are novices still struggling with 3-D visualization, the computer tools (both software and hardware), the difficult programmatic requirements, structural design and detailing, new materials and most restrictively- the time restrictions. It is simply too much information at too fast a pace. Many students simply cannot keep up and are either failing or dropping out to protect their overall program GPA. The 2 studio courses in first year have the highest attrition rates within the suite of 6 studio courses. If you can survive first year, you will graduate – eventually.

In a “real-world” professional practice, roles and responsibilities for this type of complex residential sustainable design project would be taken on as part of a multidisciplinary design team (also a LEED certification requirement) over a period of many months. Why are we asking our novices (many of whom have never designed a single family residence before) to perform this same project alone and in 14 weeks while we hold them to the same professional standard? Sheridan produces top notch graduates using this system because you have to be very good to survive it. However, this system does not work well for an average student and does not work at all for a weaker student. Also the need to produce working drawings for such a complex building residence does not permit depth of understanding. The course is experienced as a shallow rush glancing off of topics and moving on before the intricacies can be absorbed. Shouldn’t learning be scaffolded? Shouldn’t students wishing to specialize in residential practice go it alone only after having first developed the required foundational skills?

Objectives

- reduce the attrition rate caused by the excessive workload,
- increase the fun and peer support,
- introduce opportunities for collaboration and a valued contribution to shared concept,
- develop, encourage, enhance the creative process and product,
- inspire innovation in the application of technology,
- generate meaningful personal reflection upon intentions and goals,
- enhance self-judgment in the assessment of personal performance and contribution,
- prepare students for the complexity of contemporary global collaborative professional practice,
- enable students to work on complex problems in multidisciplinary settings,
- develop an expertise in a chosen specialty within the discipline of architectural technology.

Assessment Objectives

- evaluation of collaborative work must individual assessments rather than average team scores.
- evaluate student reflection on goal setting (intentions) and achievement; on their individual contribution to the overall result; and on their personal influence on other disciplinary concerns.(see 8 strands below)

8 Discipline Strands

1. architectural design: form/space/organization of plans, elevations, sections
2. landscape and site design: indigenous plants, materials, irrigation, storm water management, run-off, hard surfacing
3. Interior design: furniture layouts, millwork, fixtures (light and plumbing), appliances, finishes, materials, partition-door-window schedules
4. structural design: wall, floor and roof framing and foundation design
5. envelope design: materials /assembly selection, insulation, air/vapour barriers, detail development, wall sections
6. sustainability: materials/energy/resources/waste/equipment selection criteria, HVAC, Systems (solar, grey water, HRV) green roofs
7. presentation: oral, writing LEED reports, reflection and documentation of process, constructing physical models, 3-D representations
8. Collaboration: constructing objective/goals/ intentions, shared division of labour and scheduling, contributing meaningfully to a shared design, contributing equally in the production of drawings reports and presentations (oral and visual), being committed to one design only and to the co-ordination and execution of that design to its completion, being attentive and responsive to your partners needs and communication, being self-motivated and committed to the success of the team.

Phasing process

- 1) Immediately add creativity, reflection and collaboration outcomes to the course outline within the parameters of the associate deans review authority without LAC review required
- 2) For the next term start (Jan.2015) change from individual design to a team project (2 students) and bring back the architectural details, augment the sustainable component with a year-end design report, consider bringing in guest experts (sustainability, structural framing, rain screen design)
- 3) Summer 2015 consider adding part-time guest structural consultant tutor and a part-time LEED professional guest as well to the consultation and assessment team as allowed within SWF budgetary restrictions and timelines.
- 4) Engage the team to consider the program map implications of a multi-disciplinary approach and the linking of studio and systems 1 with some structural expertise and make required LAC changes and approvals apply for scholarly research pilot and resources.
- 5) January 2016 boost credit hours for the multi-disciplinary studio to 8 by combining Building systems 1 credit-hours and professor to make a multi-disciplinary tutorial and assessment team and credits integrate sustainable technologies: HRV's, HVAC, geothermal, on demand domestic hot water systems, grey water systems etc. into the design.

Concluding Remarks

We as a faculty group have known for some time that we have a problem with Studio 2 and its density of content, student workload, professorial evaluation allotments, student attrition, the scheduling of presentations (too many students for 5 hours). We also know that it is unlikely that this course, in its present structure, will produce brilliant individual design "heroes". To prove structural knowledge must they draw 3 framing plans? To prove CADD skills must they draw 3 floor plans? It seems that with all the pressure on the production of working drawings and speed, the existing focus is not on creativity, reflection or collaboration but on simply banging out a set of poorly conceived drawings with little or no sustainable design component.

We must conclude that we need to unpack this course curriculum. By reducing emphasis on production we will create space for collaborative design and group goal setting, time for reflection and the

development of judgment, create depth in content exploration and give students the opportunity for choice and input into what they choose to focus upon and how they will be assessed. All of these are required if we wish to engender creative judgment and intrinsic motivation.

ARCH 28544 Architectural Studio 2

Learning Outcomes Winter 2015 (as revised from 2014 and EDITED to include partnerships of 2 people)

To achieve the critical performance, successful students will have demonstrated the ability to:

1. Understand and respond to the stated needs and programmatic requirements of a client.
2. Create a functional design concept that meets stated programmatic requirements.
3. Apply zoning by-law requirements relevant to a given site.
4. Create a design layout for a residential site that incorporates LEED strategies that respond to existing environmental conditions of topography, solar orientation and wind patterns.
5. Apply LEED (Leadership in Energy and Environmental Design) strategies that affect the form space and organization of a residential dwelling.
6. Build a physical design model to a specified scale and present it to their class.
7. Collaboratively present a residential design concept to a group as part of a team.
8. Apply the requirements of the Ontario Building Code (OBC) Part 9 to the design and production of a representative set of residential working drawings of suitable quality for the application for a residential building permit that include but are not limited to the following: Site plan (including landscaping, storm water control, basic grading); floor plans; wall, building and stair sections; floor and roof framing diagrams; foundation plan; window, door and partition schedules; various details as required.
9. Work creatively and contribute meaningfully to a team as evidenced by the production of an innovative and collaborative design solution.
10. As part of a collaborative design team, produce a design report that includes (but is not limited to) the following: design intentions; design innovations; an explanation of their creativity, personal reflections upon team process and success; strategies for the division of work; sustainable strategies for water, waste and energy reduction, renewable and/or re-usable materials.

Outstanding decisions:

- Single family, duplex, semi-detached, 2nd unit?
- Creativity Assessment(s)

Weekly Syllabus:

Week 1: Introduction and Analysis

Module 1 - Architectural Programming

Module 2 - Site Plan Design
 ISSUE Ast1 - Preliminary Floor Plan Sketches (5%)
 Week 2: Organization
 Module 3 - LEED Introduction
 Module 4 - Planning Strategies and Adjacencies
 Module 8 - Stair Design
 ISSUE Ast2 - Finalized Floor Plan Sketches (5%)
 Week 3: Form and Massing - (Ast 1 DUE)
 Module 5 - Spatial Separation
 Module 6 - Roof Design
 Module 7 - Design Elevations
 ISSUE Ast3 - Elevations and Isometric (5%)
 Week 4: Creating Physical Models - (Ast 2 DUE)
 ISSUE Ast4 - Massing Model (10%)
 Week 5: Designing a Presentation - (Ast 3 DUE)
 Module 9 - Presentation Components
 Week 6: Design Feedback - (Ast 4 DUE)
 Revisions and design confirmation
 Week 7: Design Presentations to the group - (MP Phase 1 due 25%)
 -----BREAK WEEK-----
 Week 8: Introduction to Phase 2 Construction Documentation
 Module 10 - Insulation Requirements
 Module 11 - Envelope Details
 Week 9: Framing
 Module 12 - Roof Framing
 ISSUE Ast5 - Preliminary Framing Plans (5%)
 Week 10: Framing (continued)
 Module 13 - Floor Framing
 Week 11: Foundations - (Ast5 DUE)
 Module 14 - Foundation Design
 ISSUE Ast6 - Preliminary Construction Plans (5%)
 Week 12: Construction Sections - (Ast6 DUE)
 Module 15 - Contract Drawings
 ISSUE Ast7 - Preliminary Building, Stair and Wall Sections (5%)
 Week 13: Consultations Review sessions with faculty - (Ast7 DUE)
 Week 14: Project Completion and Close out
 Major Project Phase 2 Working Drawings (25%) DUE

Evaluation Strategy

MP1%: 25, + MP2: 25%, + I.C.: 10%, + AST (6@5 + 1@10): 40% = 100%

Major Project Phase1 – Design Presentation: Evaluation

In order to focus curricular attention upon the subject of “Creativity” and include a statement in this regard into the course outline as a learning outcome it has to be demonstrated as to how it will be evaluated.

Presentation to the class and jury Oral: (10) clarity of delivery, organization, intentions, design concept, content, response to questions/comments Graphic: (10) organization/layout, graphic quality, mounted, line work, hatching title blocks, north, scale, model?, 3-D image?	/20
Comments:	
Drawings and Design	
Site plan Property lines, setback line, zoning table, driveway, parking, landscape design, materials, decks, porches	/10
Building Section Roof form (eaves and fascias), solid wall hatching, windows, doors, decks, guard rails, terraces, Datum lines, vertical dims, ground line, ground hatch	/15
Floor Plans Basement: Foundation walls, windows, access, utilities, stairs, room names and sizes Main floor: Exterior and interior walls Doors and windows, (locations, symbol, size), furniture, stairs, fixtures, kitchen and washroom design, decks porches, room names and sizes Second Floor: Exterior and interior walls Doors and windows, (locations, symbol, size), furniture, stairs, fixtures, kitchen and washroom design, decks porches, room names and sizes	/20
3-D exterior view Roof (accuracy and resolution), eaves and fascias, material hatching, windows, doors, decks, guard rails, terraces, site/ground	/15
Exterior Building Elevations (ALL 4) Roof (eaves and fascias), material hatching, windows, doors, decks, guard rails, terraces, Datum lines, vertical dims,	/20

Comments:	/100
------------------	-------------

As evidenced in the above rubric from the summer of 2014 there is no obvious evaluation of creativity of the finished outcome or the formative process. It simply assumes that more creative organizational layouts, more interesting forms and more reflective practices will yield a higher grade in various categories. The balance between technical excellence and innovation / creativity is hidden.

Modifications Incorporating a line item for Creativity

Presentation to the class and jury Oral: clarity of delivery, organization, intentions, design concept, content, response to questions/comments (10)	
Graphic: organization/layout, graphic quality, mounted, line work, hatching title blocks, north, scale, model?, 3-D image (10)	
Drawings and Design	/20
Site plan Property lines, setback line, zoning table, driveway, parking, landscape design, materials, decks, porches	/10
Building Section Roof form (eaves and fascias), solid wall hatching, windows, doors, decks, guard rails, terraces, Datum lines, vertical dims, ground line, ground hatch	/10
Floor Plans Basement: Foundation walls, windows, access, utilities, stairs, room names and sizes Main floor: Exterior and interior walls Doors and windows, (locations, symbol, size), furniture, stairs, fixtures, kitchen and washroom design, decks porches, room names and sizes Second Floor: Exterior and interior walls Doors and windows, (locations, symbol, size), furniture, stairs, fixtures, kitchen and washroom design, decks porches, room names and sizes	/20
3-D exterior view Roof (accuracy and resolution), eaves and fascias, material hatching, windows, doors, decks, guard rails, terraces, site/ground	/10
Exterior Building Elevations (ALL 4) Roof (eaves and fascias), material hatching, windows, doors, decks, guard rails, terraces, Datum lines, vertical dims,	/20
Creativity (design quality)	/10
Comments:	/100

Simply recalibrating the tool and adding another line for creativity, does not seriously help students understand or offer any information or feedback to them. The inclusion of this line is often interpreted as “boring” versus “interesting” based upon the subjective preferences and experience of faculty. It

does not address the adoption of creative behaviours, the success of the process or product. If unsubstantiated,

Creativity: Fluency, Originality, Elaboration, Flexibility	/10
---	------------

Breaking the item down into component parts helps foster greater understanding but assigning equal value (@ 2.5 each) would assume that creativity requires all four components in equal measure in every creative act.

Again this is a fixed rubric and does not allow any variation based on preference or individual circumstance. To foster reflection and personal assessment and judgment students should have some input into how they will be graded.

To accomplish that, the existing rubric must be modified even more.

Modifications Incorporating Student Input (showing member “A” of a 2 member team)

ITEM and Team Member Responsibility	Q. Factor	Weight	Grade
Presentation to the class and jury Oral: clarity of delivery, organization, intentions, design concept, content, response to questions/comments	.6	10	6
Graphic: organization/layout, model	.8	10	8
Drawings and Design (/80)			
Site plan Property lines, setback line, driveway, parking, bldg. footprint	.8	5	4
Building Section Roof form (eaves and fascia), walls, windows, doors, decks, guard rails, terraces,, ground line,	.8	15	8
Floor Plans Basement: Foundation walls, windows, access, utilities, stairs, room names and sizes Main floor: Exterior and interior walls Doors and windows, (locations, symbol, size), stairs, fixtures, kitchen and washroom design, decks porches, room names and sizes Second Floor: N.A.	.8	20	16
3-D exterior view Roof (accuracy and resolution), eaves and fascias, material hatching, windows, doors, decks, guard rails, terraces, site/ground		N.A.	
Exterior Building Elevations (ALL 4) Roof (eaves and fascias), material hatching, windows, doors, decks, guard rails, terraces, Datum lines, vertical dims,	.7	30	21
Creativity Fluency: we explored 2 ea. and then did 2 combined versions = 6 Originality: roof profile and materials are unique w/in the class Elaboration: original organization and general form Flexibility: we each developed multiple ideas but the final is a combination of the best of many ideas contributed equally	.7	10	7
Comments:	< or = 1.0 each	= 100 total	70 / 100

	Q. Factor is Assigned by the educator
	Weight is Assigned by each team member after consultation with team reflecting their individual contributions must total 70% of the overall weighting

Modifications Incorporating Student Input (showing member “B” of a 2 member team)

ITEM and Team Member Responsibility	Q. Factor	Weight	Grade
Presentation to the class and jury Oral: clarity of delivery, organization, intentions, design concept, content, response to questions/comments	.8	10	8
Graphic: graphic quality, mounted, line work, hatching title blocks, north, scale, model, 3-D image	.8	10	8
Drawings and Design (80)			
Site plan zoning table, landscape design, materials, decks, porches, pathways	.7	10	7
Building Section wall hatching, Datum lines, vertical dims, ground hatch	1	10	5
Floor Plans Basement: N.A. Main floor: furniture, room names and sizes Second Floor: Exterior and interior walls Doors and windows, (locations, symbol, size), furniture, stairs, fixtures, kitchen and washroom design, decks porches, room names and sizes	.75	20	15
3-D exterior view Roof (accuracy and resolution), eaves and fascias, material hatching, windows, doors, decks, guard rails, terraces, site/ground	.8	30	24
Exterior Building Elevations (ALL 4) Roof (eaves and fascia), material hatching, windows, doors, decks, guard rails, terraces, Datum lines, vertical dims,		N.A.	
Creativity Fluency: we explored 2 ea. and then did 2 combined versions = 6 Originality: siting, use of solar orientation to shape form, landscape plantings Elaboration: made the stairs and circulation work efficiently, chose materials Flexibility: we each developed multiple ideas but the final is a combination of the best of many ideas contributed equally	.7	10	7
Comments:	< or = 1.0 each	= 100 total	74 / 100

	Assigned by the educator
	Weight is Assigned by each team member after consultation with team reflecting their individual contributions must total 70% of the overall weighting

Summative Evaluation of Creative development

If we are serious about enhancing the creative potential of ALL our graduates the get creative initiative must filter down into every course and into every course outline. This means that creative behaviour will need to be included into the syllabus and the evaluation plan. This means that it must be instructed, observed and evaluated.

Development of the Creative Potential of a student is not an event but a process that happens over time. Creativity is a unity of diverse characteristics and behaviours. (refer to the 4-P's) Therefore the evaluation of the creativity (read interest and originality) of disparate submitted works or products is simply insufficient to assess the growth or transformation toward the desired values and behaviours identified by the culture in question. Time must be devoted and feedback must be provided along the way in order to nurture creative development.

8 - Dispositions	5 - Indicators	<i>complexity</i>	<i>connections</i>	<i>flexibility</i>	<i>judgment</i>	<i>motivation</i>
1. development of craft: (skillful technique with tools/materials)						
2. engagement and persistence: (tenacity and focused process)						
3. envisioning: (imagining what does not yet exist)						
4. expression: (of ideas/feelings/meaning)						
5. observation: (seeing what was previously invisible)						
6. reflection: (question /explain /evaluate /judge)						
7. exploration: (reach beyond normal capacity)						
8. understanding professional context: (history, practices, exemplary work)						

There are 40 boxes in this matrix. You have 30 students this requires 1,200 individual observations and comments. This is untenable in this form. It simply cannot be accomplished in the last week during major project evaluation.

Try again: **Consider this:** Have the students complete a self-reflection at the end of the term using the studio thinking framework as a tool for introspection.

Summative Evaluation of Creative development

8 - Dispositions	5 - Indicators
1. development of craft: (skillful technique with tools/materials)	complexity , connections, flexibility, judgment, <u>motivation</u>
2. engagement and persistence: (tenacity and focused process)	complexity, connections, flexibility, judgment, motivation
3. envisioning: (imagining what does not yet exist)	complexity, connections, <i>flexibility</i> , judgment, motivation
4. expression: (of ideas/feelings/meaning)	complexity, connections, flexibility, judgment , motivation
5. observation: (seeing what was previously invisible)	complexity, connections, flexibility, judgment, motivation
6. reflection: (question /explain /evaluate /judge)	complexity, connections, flexibility, judgment, motivation
7. exploration: (reach beyond normal capacity)	<u>complexity</u> , connections, flexibility, judgment, motivation
8. understanding professional context: (history, practices, exemplary work)	complexity, connections, flexibility, <i>judgment</i> , motivation

Begin day 1. Make observations weekly. Develop a suitable scale.

SCORING

italics = 1 underline = 2 **bold** = 3

Example

10pts = 10%?

0-5 pts

5-10pts

10 – 15pts

15-20pts

2pts / % to max of 10?

BIBLIOGRAPHIC REFERENCES

- Anderson, T. and Milbrandt, M. (2005) *Art for Life: Authentic Instruction in Art*, New York: McGraw-Hill
- Abbs, P. (2011) *Creativity the arts and the renewal of culture* in "The Routledge International Handbook of Creative Learning" edited by Sefton-Green/Thomson/Jones/Bresler New York and London: Taylor and Francis Group. (referred to from here on as "RIHCL")
- Barthes, R. (1977) *Image, Music, Text* London: Fontana Press
- Belardi, Paolo (2014) *Why Architects Still Draw* Cambridge, Massachusetts: MIT Press
- Belfiore, E. (2011) *The Transformative Power of the Arts* in (RIHCL)
- Bentley, T. and Selzer, K. (1999) *The Creative Age* London: Demos
- Bell, C. (1993) *The Aesthetic Hypothesis* as quoted by Emily Pringle 2011.
- Boud, D. (1988) *Developing Student Autonomy in Learning* London: Kogan Page.
- Buchanan, P. (2012) *The Big Rethink Part 9: Rethinking Architectural Education* London: Architectural Record
- Craft, A., Cremin, T., Burnard, P. (2008) (eds) *Creative Learning 3-11 and how we document it: What, How and why* London: Trentham Books.
- Crosbie, Michael J. (2007) *Assessing Architectural Education's 'Crown Jewel'* in the International Journal of Architectural Research
- Csikszentmihalyi, M. and Csikszentmihalyi, I.S. (1988) *Optimal Experience: Psychological Studies of Flow in Consciousness* Cambridge: Cambridge University Press.
- Dezuanni, M. and Jetnikoff, A. (2011) *Creative Pedagogies and the Contemporary Classroom* in (RIHCL)
- Ellis, Bars (2008) *Assessment of Creative Learning* in Sefton-Green, J., (ed) *Creative Learning* London, Creative partnerships Arts Council England.
- Fisher, R. and Williams, M. (2004) *Unlocking Creativity*, London: David Fulton
- Fleming, M. (2011) *Learning in and through the arts* in (RIHCL)
- Hargreaves, A. (2011) *21st Century Skills are on Mercury* in (RIHCL)
- Hayes, D. (2011) *Ways of Knowing and Teaching* in (RIHCL)
- Hetland, L., Winner, E. (2011) *Creativity and Studio Thinking* in (RIHCL)
- Jones, K. (2011-1) *Capitalism, creativity and learning* in (RIHCL)
- (Jones, K. (2011-2) *Democratic Creativity* in (RIHCL)
- Leong, S. (2011) *Creativity and the arts in Chinese societies* in (RIHCL)
- Matsunobu, K. (2011) *Creativity of formulaic learning: Pedagogy of imitation and repetition* in (RIHCL)
- Moonen, S.P.G., Veeger, T.T. (2013) *Evaluation Assessment Carrousel for Multidisciplinary Design Projects* Eindhoven, Netherlands, Dept. of the built Environment

- Moonen, S.P.G. & Veeger, T. (2013) "Organization and assessment of a multidisciplinary project" PAEE (Project Approaches in Engineering Education)
- Pallasmaa, Juhani (2011) *"The Embodied Image: Imagination and Imagery in Architecture"* Published by John Wiley and Sons Ltd. ISBN 978-0-470-71190-3
- Pringle, E. (2011) *"The gallery as a Site for Creative Learning"* in (RIHCL)
- Robinson, J.W. (2001) *"The Discipline of Architecture"* University of Minnesota Press
- Runco, M. A., Pagnani, A.M. (2011) *"Psychological Research on Creativity"* in (RIHCL)
- Salama, Ashraf M. (2009) *"Transformative Pedagogy in Architecture and Urbanism"*, Solingen Germany, Umbau Verlag
- Salingaros, N. (2009) Preface in *"Transformative Pedagogy in Architecture and Urbanism"*, Solingen Germany, Umbau Verlag
- Sefton-Green, J., Thomson, P., Jones, K., Bresler, L.(2011) (ed. and contributors) *"The Routledge International Handbook of Creative Learning"* New York and London: Taylor and Francis Group. (RIHCL)
- Sefton-Green, J (2011a) *"Judgment, Authority and Legitimacy: Evaluating Creative Learning"* in (RIHCL)
- Tobin, J., Hayashi, A., Zhang, J. (2011) *"Approaches to Promoting Creativity in Chinese, Japanese and U.S. Preschools"* in (RIHCL)
- Watkins, C. (2003) *"Learning, a sense Makers Guide"* London: Association of Teachers and Learners and The Institute of Education
- Wallas, G. (1926) *"The Art of Thought"*, London: Jonathan Cape (referenced not read)
- Wiggins, G. (2011) *"Creative Learning"* in (RIHCL)

Web Sources

- Gloster, D., Platt, C. (2014) (panelists) *"The Big Debate - The Future of Architectural Education"* Glasgow School of Art Mackintosh School of Architecture and **Architecture+Design**Scotland
<http://www.ads.org.uk/access/features/the-big-debate-the-future-of-architectural-education>